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[ClusterReplica SQL 3.0 User Manual]


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# CHAPTER 1

# Introduction

ClusterReplica SQL 3.0 is a software solution specializes in handling MS SQL database file replications. Running on two Microsoft Windows 2003/2000/XP systems, ClusterReplica binds them into one clustering system to serve the network clients.

## 1.1 What is ClusterReplica SQL 3.0

ClusterReplica SQL 3.0 edition is specially designed for Microsoft SQL database servers clustering to perform file replication and failover. This special edition is created as a "turn-key" product that when the MS SQL server is configured with default settings, data replication and failover functions of ClusterReplica are to be automatically configured so that users of not much database server knowledge can use this software without sweat.

Main features of ClusterReplica SQL 3.0 include:

**Active/Standby configuration** – In this configuration, SQL server service on the Secondary station is disabled. So the Secondary station is standby and files on it being updated in real time so that it can be ready should Failover takes place.

**Active/Active configuration** - In this configuration, SQL server service on both Primary and Secondary stations are on so that users can extract data from the Secondary for data analysis and report purposes. Data replication is in real time as it is in the Active/Standby mode.

**A built-in backup utility tool is included** - This tool assist users to backup data on the cluster server to a remote (or local) location for data protection. Typically backup runs on the Secondary station so that the process will not interfere with network traffic serviced on the Primary station.

Besides database files, ClusterReplica SQL 3.0 can also replicate other types of files including dynamically generated registry files. ClusterReplica SQL 3.0 is a powerful network server application of all purposes.

## 1.2 Whom is ClusterReplica SQL 3.0 Designed For

ClusterReplica SQL 3.0 is a fully functional data replication and Failover/Failback server available software. It is a data protection solution for small businesses and sub-divisions of large corporations.

With automatic default configuration on MS SQL database file replication, small business owners can utilize the software without depending on IT experts to setup and run the cluster server for their business needs. When in its active/active configuration, SQL service on both Primary and Secondary stations are on so that users can extract data from the Secondary for data analysis and report purposes. Data replication is in real time as it is in the Active/Standby mode.

For small businesses, ClusterReplica SQL 3.0 comes with easy to use graphic user interface tools for software configuration. Buttons lead to dialogue boxes for each of the feature setup. The convenient online help with detailed instructions and the *talk to the person* kind of technical support bring assurance to small business owners in using ClusterReplica. The compatible pricing for the product also helps small businesses in their data protection decisions.

For sub-division managers in a large corportation, keeping the server available means to keep up the productivity. Managers also need up-to-date data to make reports and better direct working strategies.

Small business owners and managers alike should all find it a compatitive and cost-effective solustion for server availability and data protection. ClusterReplica SQL 3.0 is a useful tool to satisfy today's data protection need for all.

## 1.3 How Does ClusterReplica SQL 3.0 Work

ClusterReplica SQL binds two Microsoft Windows systems together to function as one **cluster server**, so at any time, there will be at least one system running to serve the network clients requests.

Within the cluster server, one is taking the ACTIVE role to be the Primary station, and the other taking the STANDBY role to be the Secondary station. During standard condition, both systems are running normally, the Primary station will serve the network clients and replicate all newly changed data to the Secondary station to keep it current with all data.

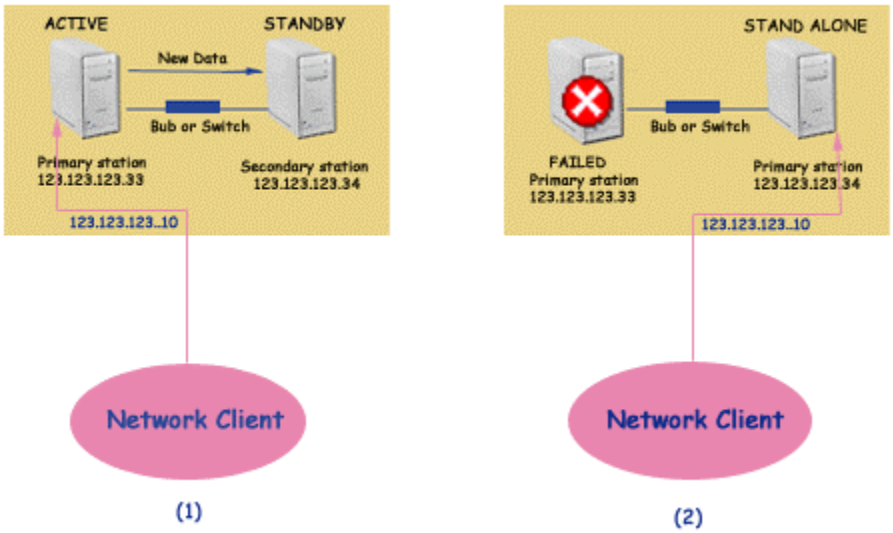
This continuous data replication works on open and locked files including the database files. The process ensures all changed data updated at all times. No data will be lost due to system down or a service failure, and server service should be available 24/7.

Following are some examples to further explain the three main features of ClusterReplica SQL 3.0.

**Example One** - Automatic Failover

In this situation, the Primary station is completely out of the cluster server and the Secondary station is to operate as standalone server until the Primary station is plugged back to the cluster server. Following pictures present the situation graphically where the two systems in the yellow frame make up the cluster server.

- Picture (1) shows a normal working situation of the cluster server.
- Picture (2) shows the situation after a Failover.




**Example Two** – Active/Active mode

When the cluster server is set in **active/active mode**, the Failover/Failback and real time data replication functions are all working in the same manner as it is in the normal active/standby mode. Data replicated to the Secondary station will, however, be first saved into a temporary workspace and copied into replication destination in user defined time interval.

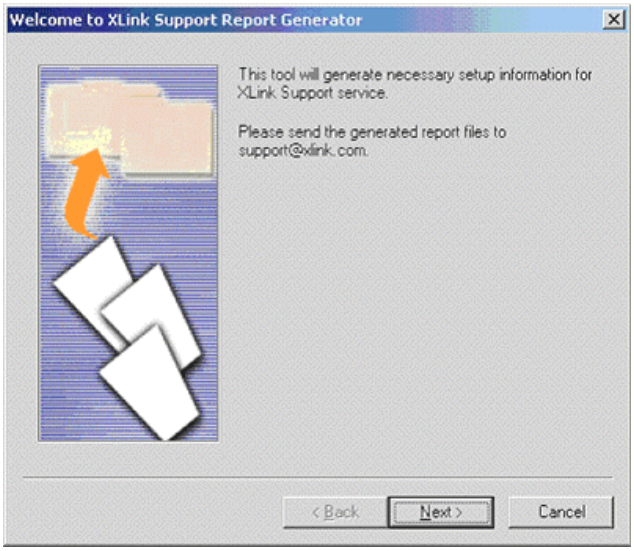
Here is the summary of the situation:

- update time interval - every 4 hours originally set at 8:00pm
- in the data replication destination on the Secondary station
    1. at 8:00am, when you make a report, it will contain only the data up to 7:00am that day
    2. at 4:00pm, the data in the replication destination should be updated to include all new data entered up to 3:00pm.

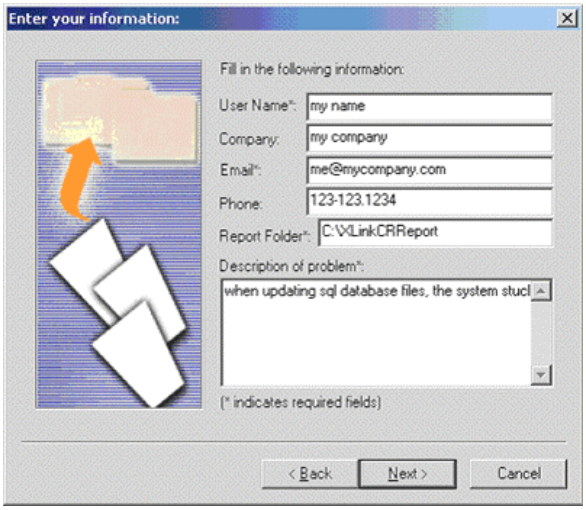
## 1.4 How To Get Help

Due to complex system configurations of ClusterReplica software, XLink specially designed an "Error Report" log file. Users must follow listed steps to generate this report log.

1 From ClusterReplica user interface, click **Help** on the menu bar, then select **Generate Report for Support**
2 Following dialog box will come up


Welcome to XLink Support Report Generator
This tool will generate necessary setup information for XLink Support service.
Please send the generated report files to support@xlink.com.
< Back
Next >
Cancel

1. Fill in the information with description of your problem, then click "Next". Next screen confirms the input. If you wish to make changes, click "Back" to go back to previous page.
2. If all looks right, click "finish" to complete the process.



Now you have generated the error log. Go to C:\XLinkCRReport to find the file "Reportsetup.txt". Email this file to support@xlink.com and we will contact you for possible solutions.

If you have further questions regarding this product, please feel free to contact us.

Phone: 408-263-8201
fax: 408-263-8203
email: support@xlink.com

**NOTE:** Please always include the product name in the subject line when you send email for support. Thanks.

# Installing/Removing ClusterReplica SQL 3.0

A cluster server binds two or more computer systems together to function as one. The clustered systems need to communicate with each other. At the same time, one of the clustered systems will take up the responsibility to server the network clients. This setting requires internal communication between the clustered servers as well as external communication between the server and the network clients.

## 2.1 System Requirements for Running ClusterReplica SQL 3.0

**Before install** ClusterReplica SQL 3.0, please check the system requirements to make sure your system can handle the software properly.

- Two Microsoft Windows systems of 2000/XP/2003 platforms with ethernet connection
- RAM: 128MB or above
- Hard disk: 8GB or larger
- Network connections between the clustered systems

**The most important** condition being that the clustered systems must **not** be the domain controller or the DNS server.

**Tips: Using one or two network cards**

> **One network card** - If the systems you are going to install ClusterReplica SQL 3.0 each has one network card, this means the cluster server operates with both internal and external communications moving within one subnet.
>
> In this situation, the cluster internal communication tangles up with the server clients communication. The work load on the communication channel can be constantly overloaded. There is also the concern of data processing speed and data transfer security.
>
> **Two network cards** - By installing two network cards on each of the clustered systems, the internal and external communications are separated. One set of IPs can then be devoted strictly to the internal communications of the clustered systems without the interference of the public network traffic.

**For example:**

system1: 123.123.123.10, 195.2.1.74
system2: 123.123.123.16, 195.2.1.75

The 123 subnet is to be used for clustered systems internal communication, and the 195 subnet is to be used for server/clients connection.
The effect on this setting of two network cards is remarkable. From security standpoint, the separation of the internal and external traffic on the cluster server eliminates the possibility of public interference of the servers internal activities. Now, data transfer security is ensured.

On the same footing, the improvement of server performance in the eyes of network clients can also be notable. First, with two subnets, network traffic is reduced. Secondly, each set of IP addresses devoted to specific tasks, efficiency increased.

## 2.2 Installation Guide

Before install ClusterReplica SQL 3.0, some attention points are listed blow:

- One license key is to be used on both systems for installation.
- A **virtual IP** must be added on the Primary station on the network card to be used for public connection.
- If each of the servers has **two network cards**, be sure that the two sets of subnets are matching on the Primary and the Secondary stations.

  **For example**:

  system1: 123.123.123.10, 195.2.1.74/195.2.1.76 (virtual IP)
  system2: 123.123.123.16, 195.2.1.75

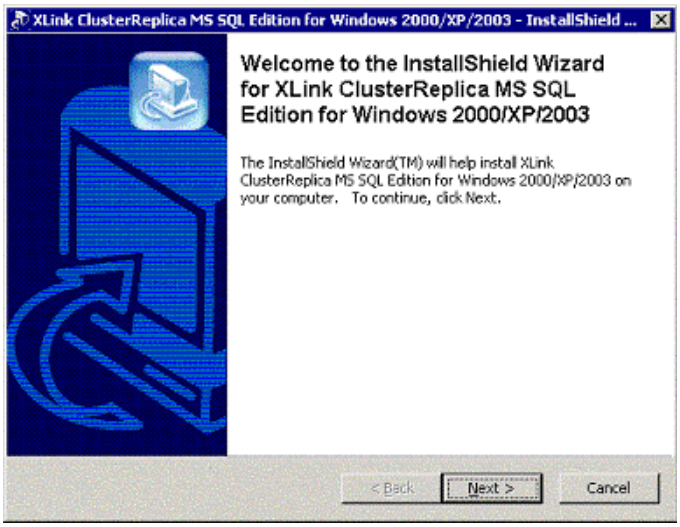
  The 195 subnet is to be used for server public connection, and system1 is to be used for Primary station. So, a virtual IP of 195.2.1.76 is added to system1.

---

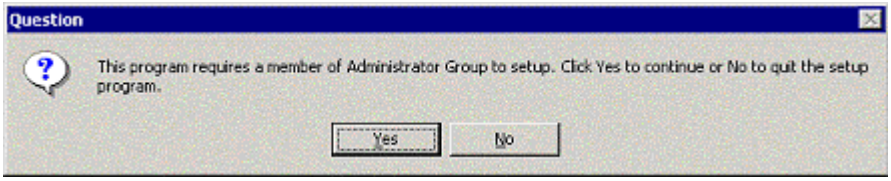
**Steps in details**:

With a successful download, you will get the **ClusterReplica_sql.exe** file as the installer. Double click on it to start installation process.

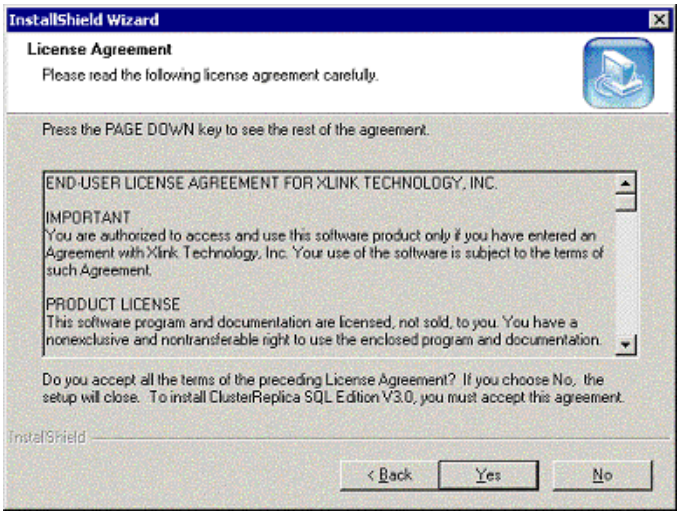
1. The first screen as seen below greets you with the product name.


XLink ClusterReplica MS SQL Edition for Windows 2000/XP/2003 - InstallShield ...
Welcome to the InstallShield Wizard for XLink ClusterReplica MS SQL Edition for Windows 2000/XP/2003
The InstallShield Wizard(TM) will help install XLink ClusterReplica MS SQL Edition for Windows 2000/XP/2003 on your computer. To continue, click Next.
< Back
Next >
Cancel

2. Click on button **Next** to move on. Following message box will come up to remind you the software requires a member of administrators group to perform the installation.


Question
This program requires a member of Administrator Group to setup. Click Yes to continue or No to quit the setup program.
Yes
No

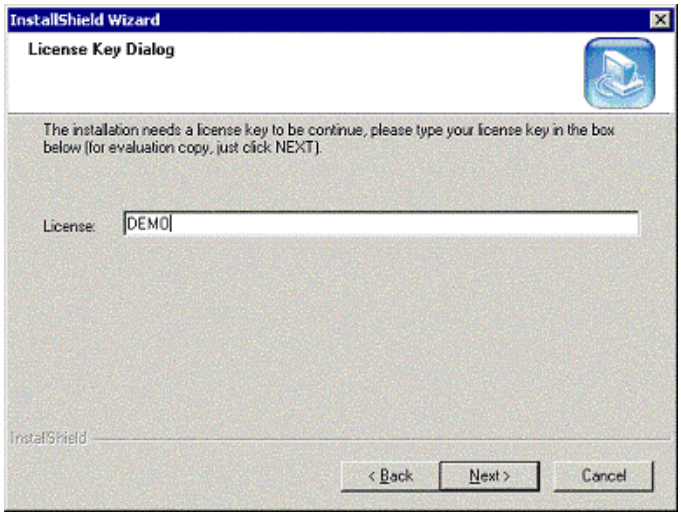
3. If you are already logged in as a member of the administrators, click on **yes** to continue. Along the way, you will see the license agreement with conditions on using the software properly.


InstallShield Wizard
License Agreement
Please read the following license agreement carefully.
Press the PAGE DOWN key to see the rest of the agreement.
END-USER LICENSE AGREEMENT FOR XLINK TECHNOLOGY, INC.
IMPORTANT
You are authorized to access and use this software product only if you have entered an Agreement with Xlink Technology, Inc. Your use of the software is subject to the terms of such Agreement.
PRODUCT LICENSE
This software program and documentation are licensed, not sold, to you. You have a nonexclusive and nontransferable right to use the enclosed program and documentation.
Do you accept all the terms of the preceding License Agreement? If you choose No, the setup will close. To install ClusterReplica SQL Edition V3.0, you must accept this agreement.
InstallShield
< Back
Yes
No

Please read the agreement carefully and be sure you fully understand every term listed and that you agree with this agreement entirely before proceed with the installation.

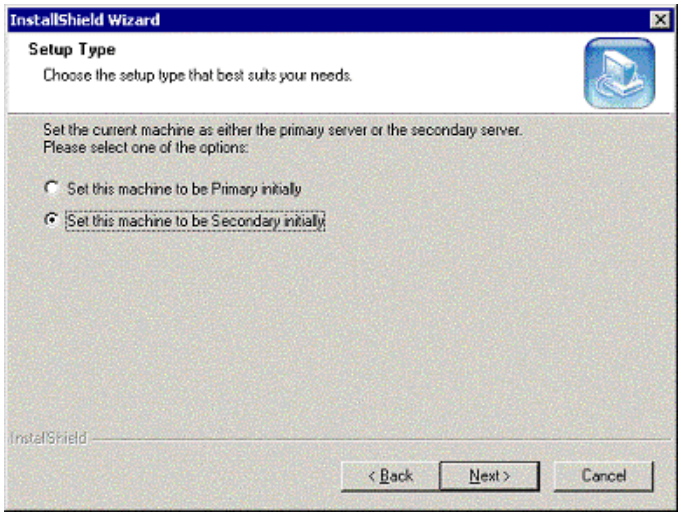
Click **No** if you disagree with any of the terms listed in the license agreement. The installation process will abort.

4. If you clicked **Yes** in 3, the next screen prompts for you to fill in the license key for using the product.


InstallShield Wizard
License Key Dialog
The installation needs a license key to be continue, please type your license key in the box below (for evaluation copy, just click NEXT).
License:
DEMO
InstallShield
< Back
Next >
Cancel

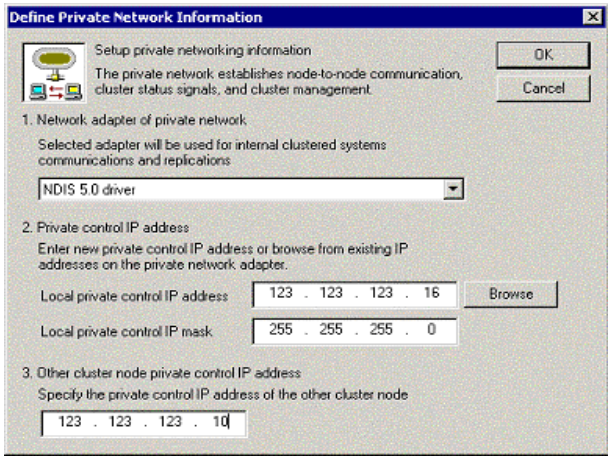
5. The **License** box is filled with DEMO as the default entry. If you have not purchase a license for the product and just want to install the demo package, leave this default entry in the box and click on **next** to continue.

6. The next screen asks you to decide if you want to set the local system as the Primary system or the Secondary system. Select one and continue.


InstallShield Wizard
Setup Type
Choose the setup type that best suits your needs.
Set the current machine as either the primary server or the secondary server.
Please select one of the options:
Set this machine to be Primary initially
Set this machine to be Secondary initially
InstallShield
< Back
Next >
Cancel

7. In the next screen, some IP addresses are to be filled in.
   **NOTE:** The IP used here is for the cluster server's internal communication

.

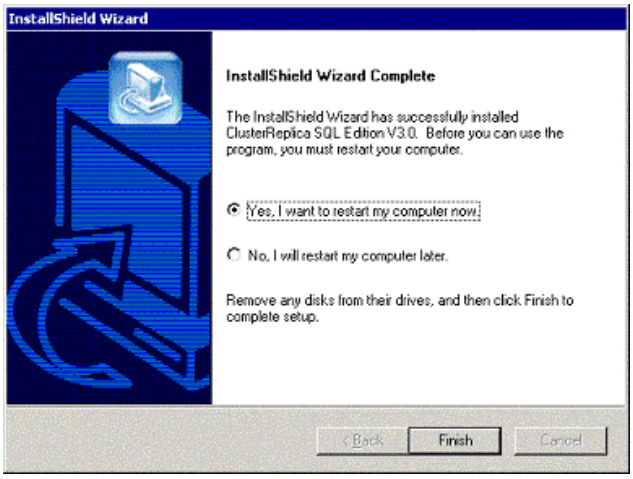

Define Private Network Information
Setup private networking information
The private network establishes node-to-node communication, cluster status signals, and cluster management.
OK
Cancel
1. Network adapter of private network
Selected adapter will be used for internal clustered systems communications and replications
NDIS 5.0 driver
2. Private control IP address
Enter new private control IP address or browse from existing IP addresses on the private network adapter.
Local private control IP address
123 . 123 . 123 . 16
Browse
Local private control IP mask
255 . 255 . 255 . 0
3. Other cluster node private control IP address
Specify the private control IP address of the other cluster node
123 . 123 . 123 . 10

For one network card systems - the internal and external communications are using the same subnet IPs - there is no need to distinguish.

For systems with two network cards - the internal and external communications are using different subnet IPs - be sure to enter the IPs that are to be used for **internal communications**. As in above example, the 123 subnet is entered.

**We recommend** you use two network cards for the clustered systems: one is dedicated to the internal communication, one is dedicated to public connection. This setting works for better security and efficiency in the cluster server.

8. Click **OK** to move along the installation process. If all goes well, a few more clicks will bring you to the last screen.


InstallShield Wizard
InstallShield Wizard Complete
The InstallShield Wizard has successfully installed ClusterReplica SQL Edition V3.0. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish
Cancel

Now you have successfully installed ClusterReplica SQL 3.0 software.

**For Windows 2003 and XP systems, system reboot at the end of installation of ClusterReplica SQL 3.0 is not required**.

## 2.3 Running the evaluation package

ClusterReplica SQL 3.0, like all other Xlink's products, has a 30-day evaluation period. This means you can download a copy of ClusterReplica SQL 3.0 from our web site and test run it for 30 days to decide if the software fits your needs and system environment. We encourage and recommend you to take advantage of the evaluation package and make sure you can use the software before purchase.

If, after careful evaluation, you decide to use the software, a replace of the license key will allow you to continue using ClusterReplica SQL 3.0 without uninstall.

## 2.4 Removing ClusterReplica

ClusterReplica MSSQL Edition is equipped with its own **uninstall** program. You can find it by clicking on Windows **Start/Programs/Xlink ClusterReplica**.

If for any reason you want to remove the software from your system, run this **uninstall** program will remove all files of it. Using Windows **add/remove** program should reach the same result. Be sure to reboot the system after running uninstall.

# CHAPTER 3

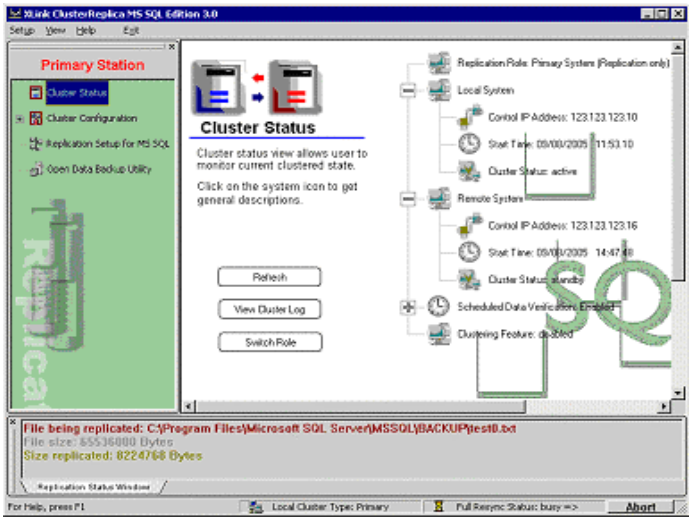
# Understand ClusterReplica SQL 3.0 Status

The successful installation of ClusterReplica SQL 3.0 sets the cluster server in **replication only** mode. The default settings of the cluster server is presented below.

## 3.1 Checking the Status on Your Cluster Server

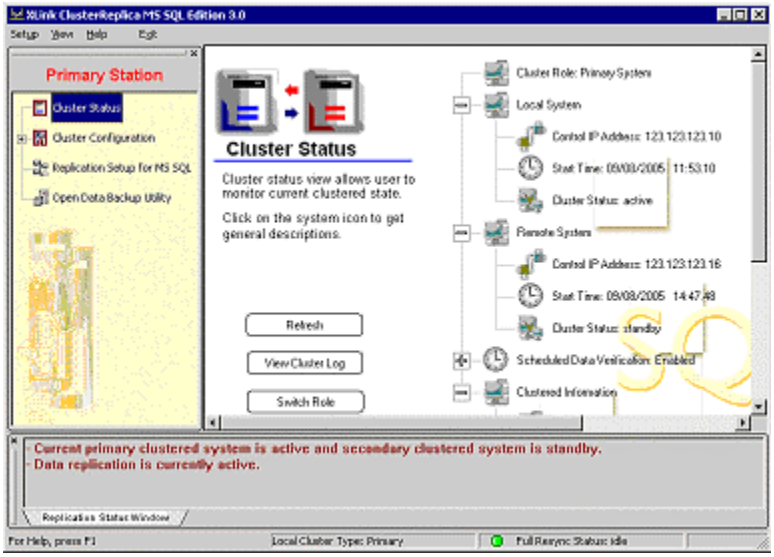
In this first screen, we can pick up following information:

- The server is the **Primary Station**
- The local system has **Control IP** 123.123.123.10 and functions as the **Active** server
- The remote system has **Control IP** 123.123.123.16 and functions as the **Standby** server
- The scheduled **Data Verification** is enabled
- The **Failover** function is disabled – Users need to configure the **Failover Setup** for automatic Failover and Failback functions.



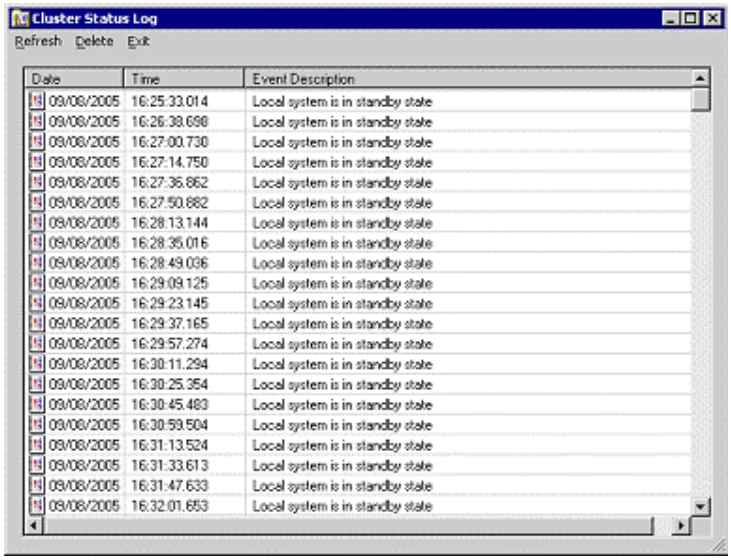

The **Replication Status Window** at the bottom of the screen indicating the initial file sync is in progress. **It is recommended that no user action is to be taken before the completion of this initial file sync process.**

When the initial file sync is completed, the **Replication Status Window** will show as in next picture. Now, you can proceed to add additional file replication paths and application services for failover monitoring.

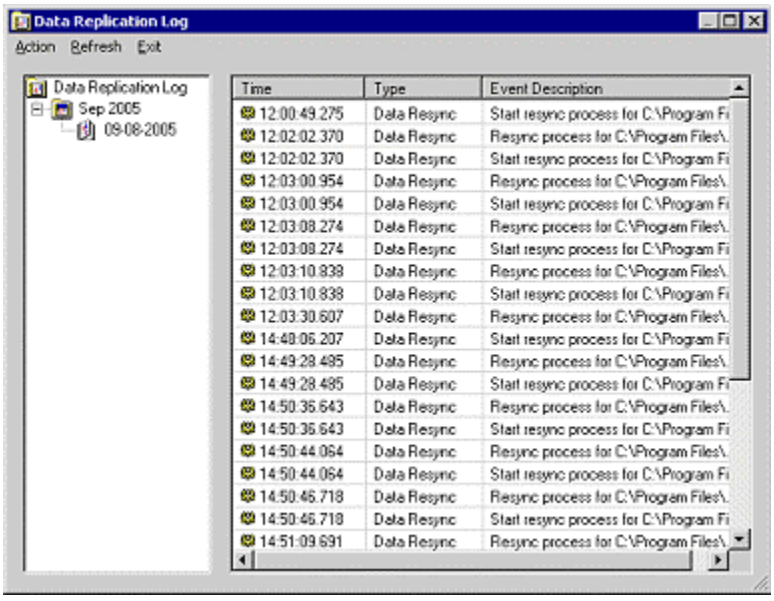

XLink ClusterReplica MS SQL Edition 3.0
Setup View Help Exit
Primary Station
Cluster Status
Cluster Configuration
Replication Setup for MS SQL
Open Data Backup Utility
Cluster Status
Cluster status view allows user to monitor current clustered state.
Click on the system icon to get general descriptions.
Refresh
View Cluster Log
Switch Role
Cluster Role: Primary System
Local System
Control IP Address: 123.123.123.10
Start Time: 09/08/2005 11:53:10
Cluster Status: active
Remote System
Control IP Address: 123.123.123.16
Start Time: 09/08/2005 14:47:48
Cluster Status: standby
Scheduled Data Verification: Enabled
Clustered Information
Current primary clustered system is active and secondary clustered system is standby.
Data replication is currently active.
Replication Status Window
For Help, press F1
Local Cluster Type: Primary
Full Resync Status: Idle

The detailed status of data replication and file backup can be checked by looking into their log files. Click **View** on the tool bar and view each of the status logs as shown in following pictures.

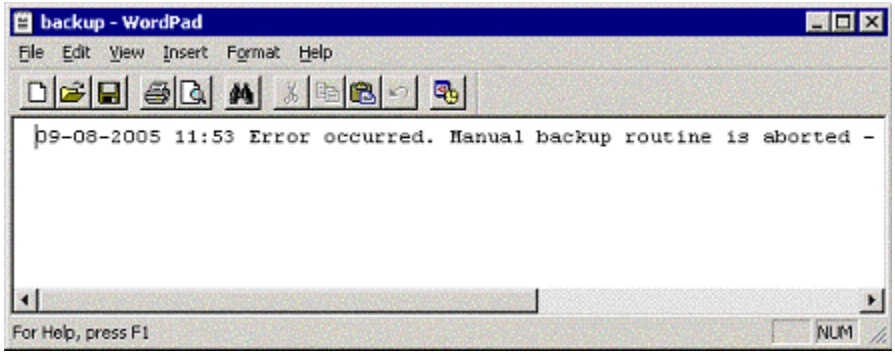
### Cluster Status Log


Cluster Status Log
Refresh Delete Exit
Date Time Event Description
09/08/2005 16:25:33.014 Local system is in standby state
09/08/2005 16:26:38.698 Local system is in standby state
09/08/2005 16:27:00.730 Local system is in standby state
09/08/2005 16:27:14.750 Local system is in standby state
09/08/2005 16:27:36.862 Local system is in standby state
09/08/2005 16:27:50.882 Local system is in standby state
09/08/2005 16:28:13.144 Local system is in standby state
09/08/2005 16:28:35.016 Local system is in standby state
09/08/2005 16:28:49.036 Local system is in standby state
09/08/2005 16:29:09.125 Local system is in standby state
09/08/2005 16:29:23.145 Local system is in standby state
09/08/2005 16:29:37.165 Local system is in standby state
09/08/2005 16:29:57.274 Local system is in standby state
09/08/2005 16:30:11.294 Local system is in standby state
09/08/2005 16:30:25.354 Local system is in standby state
09/08/2005 16:30:45.483 Local system is in standby state
09/08/2005 16:30:59.504 Local system is in standby state
09/08/2005 16:31:13.524 Local system is in standby state
09/08/2005 16:31:33.613 Local system is in standby state
09/08/2005 16:31:47.633 Local system is in standby state
09/08/2005 16:32:01.653 Local system is in standby state

## Data Replication Log


Data Replication Log
Action Refresh Exit
Data Replication Log
Sep 2005
09-08-2005
Time Type Event Description
12:00:49.275 Data Resync Start resync process for C:\Program Fi
12:02:02.370 Data Resync Resync process for C:\Program Files\.
12:02:02.370 Data Resync Start resync process for C:\Program Fi
12:03:00.954 Data Resync Resync process for C:\Program Files\.
12:03:00.954 Data Resync Start resync process for C:\Program Fi
12:03:08.274 Data Resync Resync process for C:\Program Files\.
12:03:08.274 Data Resync Start resync process for C:\Program Fi
12:03:10.838 Data Resync Resync process for C:\Program Files\.
12:03:10.838 Data Resync Start resync process for C:\Program Fi
12:03:30.607 Data Resync Resync process for C:\Program Files\.
14:48:06.207 Data Resync Start resync process for C:\Program Fi
14:49:28.485 Data Resync Resync process for C:\Program Files\.
14:49:28.485 Data Resync Start resync process for C:\Program Fi
14:50:36.643 Data Resync Resync process for C:\Program Files\.
14:50:36.643 Data Resync Start resync process for C:\Program Fi
14:50:44.064 Data Resync Resync process for C:\Program Files\.
14:50:44.064 Data Resync Start resync process for C:\Program Fi
14:50:46.718 Data Resync Resync process for C:\Program Files\.
14:50:46.718 Data Resync Start resync process for C:\Program Fi
14:51:09.691 Data Resync Resync process for C:\Program Files\.

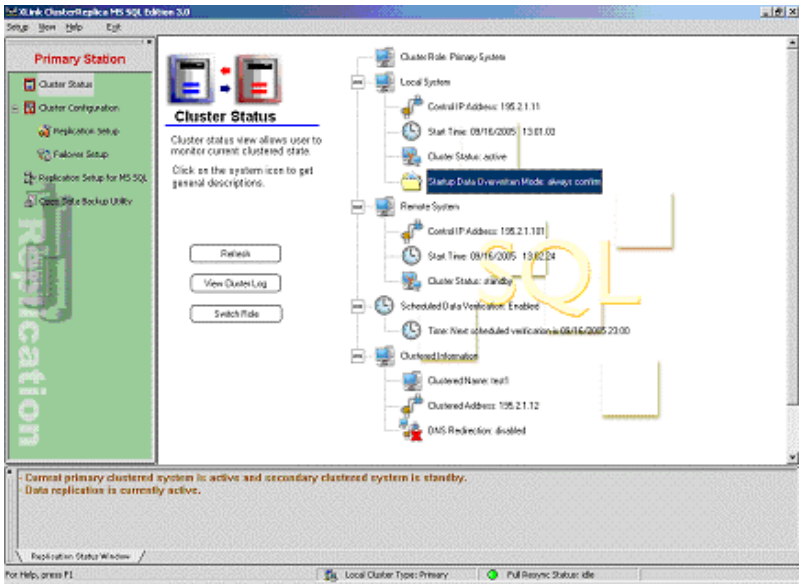
## File Backup Log


backup - WordPad
File Edit View Insert Format Help
09-08-2005 11:53 Error occurred. Manual backup routine is aborted -
For Help, press F1
NUM

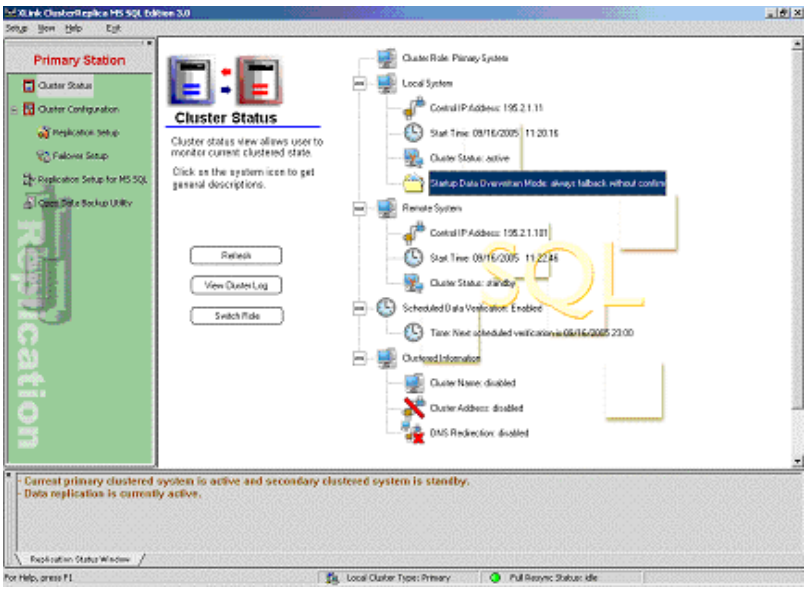
## 3.2 Other Cluster Status During Operation

Following lists some important cluster status when the cluster server is in operation with simple explanations.

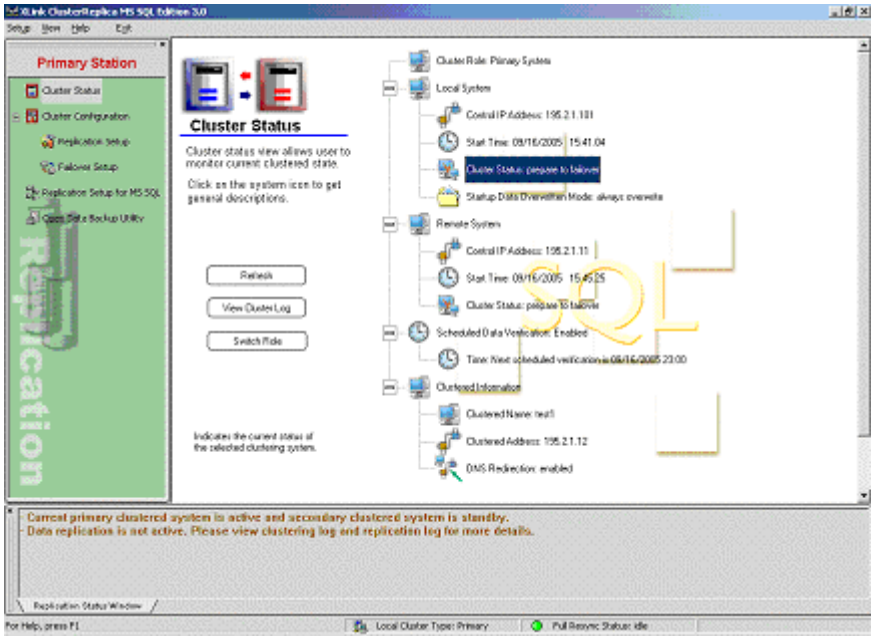
1. Cluster server is in **Always confirm** mode. This mode affects only the file sync process when the cluster server Failback to avoid data loss should the standalone server start copying files automatically into the newly-start server. This configuration can be set in **Replication configuration**.



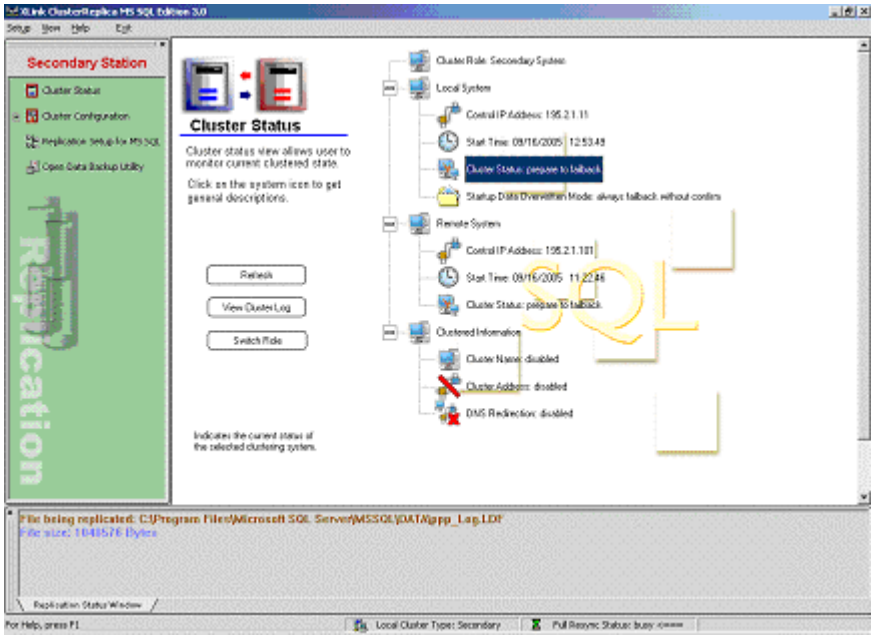

2. Cluster server is set in **Overwrite** mode. This is the reciprocal mode of the first one. So, when cluster server Failback, files on the standalone server will be copied to the newly-start server **without** further confirmation.



3. Following picture shows the cluster server is to prepare for Failvoer. It means that a malfunction of the Primary station is detected and the Secondary station is getting ready to take over the active role and running in standalone mode.

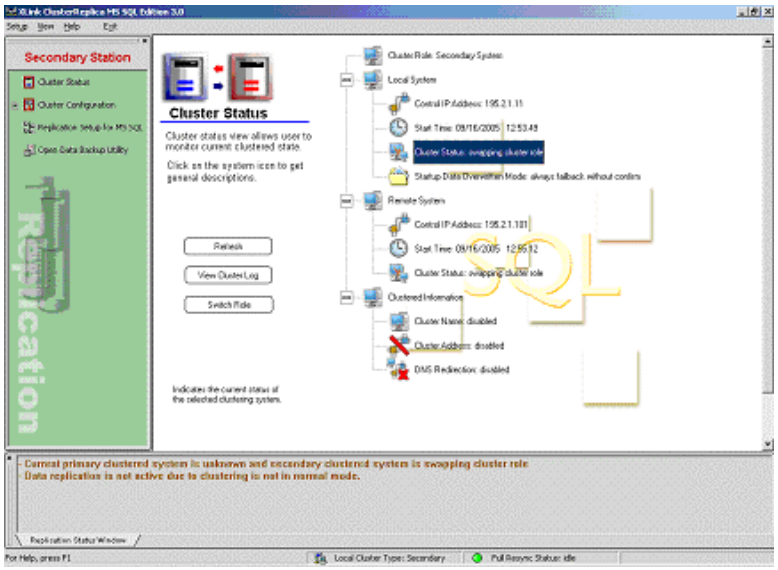

Primary Station
Cluster Status
Refresh
View Cluster Log
Switch Role
Current primary clustered system is active and secondary clustered system is standby.
Data replication is not active. Please view clustering log and replication log for more details.

4. Following picture shows the cluster server is in Failback process. During this process, files on the standalone server are copied into the newly-start server, and upon completion of this file sync, the newly-start server will be reset as the Primary station.

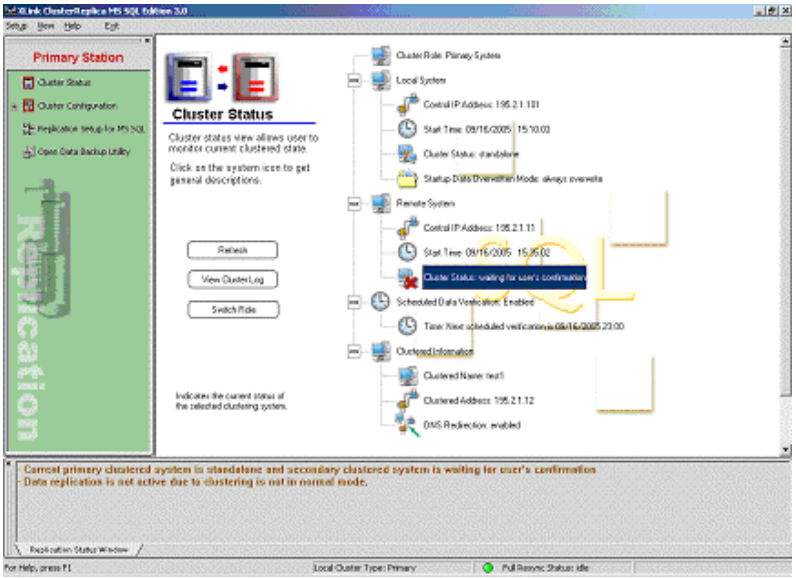


5. Following picture shows that the cluster server is waiting for the systems to swap roles. This status of the cluster server can be found in one of the situations:

    - User manually switch the role of the Primary and Secondary stations by click the button **Switch Role** on the status screen.
    - At the end of a Failback process when file sync is completed and the newly-start server is to take up the active role and turn itself to become the Primary station.




6. Following cluster status will show up when one of the clustered systems is waiting for the other one to determine its role. It will occur in a Failover or Failback process.

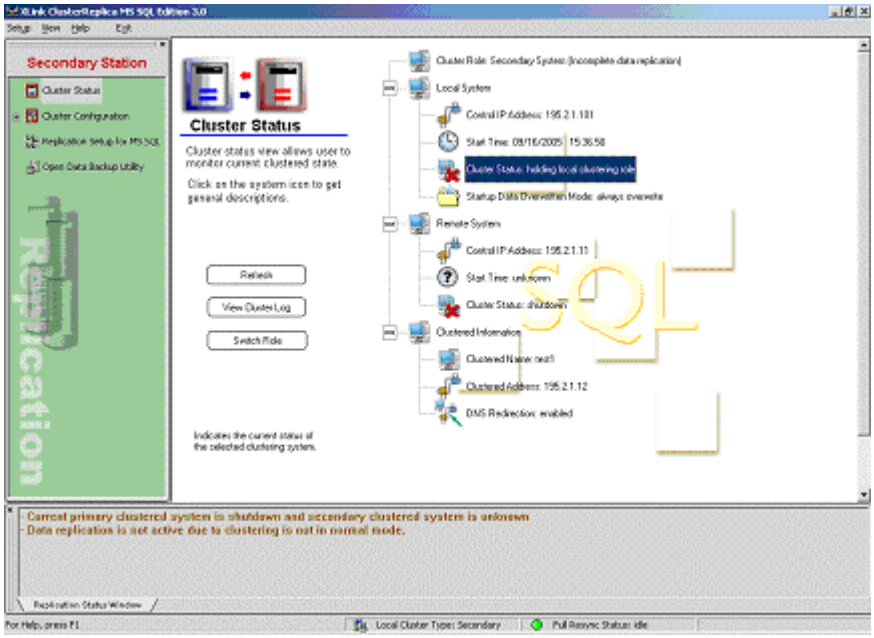


7. Following picture shows a **Holding** status on the Secondary station. This status indicates that the Primary station failed during a data replication process and that the data on the Secondary station is **incomplete**.

   The Secondary station is now running in standalone mode, but it cannot take over the active role because it does not have the usable data to server the clients. Two things can be done to correct the situation:

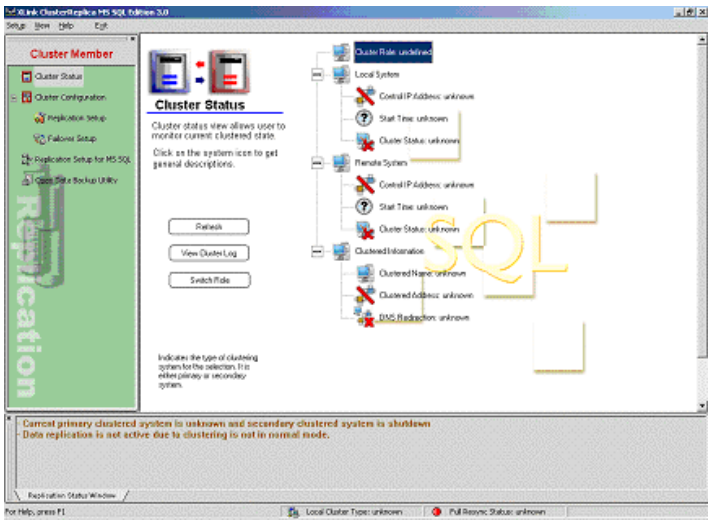
   1. Manually restart the Primary station to perform a Failback **without** having the data on the Primary station to be overwritten - that is make sure the Primary station is in **Always confirm** mode (see status description 1).
   2. Fix up the data on the Secondary station and switch its role to be the Primary station.

   This condition is set for data protection purpose.


Secondary Station
Cluster Status
Cluster Configuration
Replication Setup for MS SQL
Open Data Backup Utility
Replication
Cluster Status
Cluster status view allows user to monitor current clustered state.
Click on the system icon to get general descriptions.
Refresh
View Cluster Log
Switch Role
Indicates the current status of the selected clustering system.
Local System
Remote System
Clustered Information
Clustered Name: test1
Clustered Address: 195.2.1.12
DNS Redirection: enabled
SQL
Cannot primary clustered system is shutdown and secondary clustered system is unknown
- Data replication is not active due to clustering is not in normal mode.
Replication Status Window
For Help, press F1
Local Cluster Type: Secondary
Pull Resync Status: idle

8. Following picture shows the **Failed Server** status which indicates that the ClusterReplica SQL 3.0 service on local system is not running properly. It now has lost connection to the remote system, and therefore cannot decide the role it must take in the cluster server.

   Users can try to restart the service or reboot the system to bring the system back to normal state.




## 3.3 Email Alert

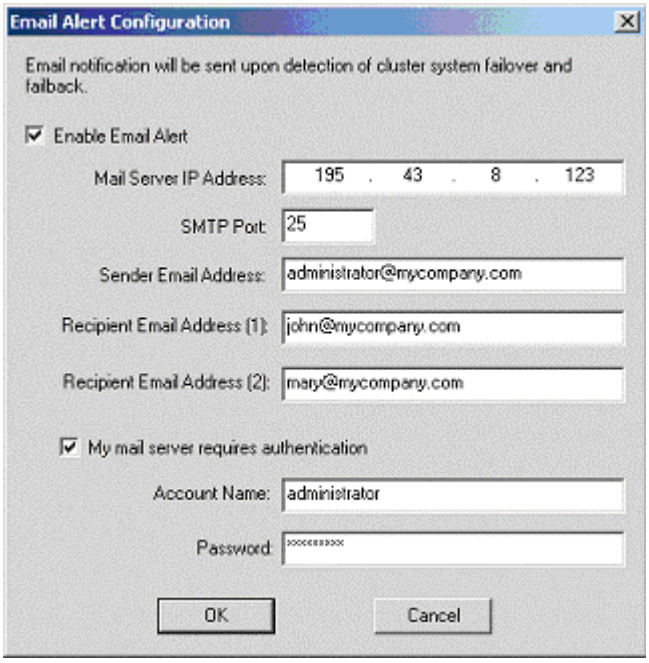
In two situations this feature can show importance:

1 When a Failover occurs

2 When a Data Replication definition item is disabled by ClusterReplica process to prevent improper data replication

With proper setup of this tool, system administrators will be notified of happening of above situation.

To set it up, from ClusterReplica's main status window, click the tool bar button "Options", then select "email alert setup".


Email Alert Configuration
Email notification will be sent upon detection of cluster system failover and failback.
Enable Email Alert
Mail Server IP Address: 195 . 43 . 8 . 123
SMTP Port: 25
Sender Email Address: administrator@mycompany.com
Recipient Email Address (1): john@mycompany.com
Recipient Email Address (2): mary@mycompany.com
My mail server requires authentication
Account Name: administrator
Password:
OK
Cancel

# Understand Failover and Failback

**Failover** is the process in which the Secondary station of the cluster system take over the active role of the Primary station when failure of the Primary station is detected. The failure of the Primary station can be either the entire system is down or one of the monitored services fails.

**Failback** is the process in which Primary station resumes its Primary role after an Failover event.

## 4.1 Failover or Not Failover

The main purposes of clustering servers are:

1. Real-time data replication for data protection
2. Failover for server 24x7 availability

While the first situation requires no Failover function and the second situation does. ClusterReplica SQL 3.0 supports both purposes.

### 4.11 Using the Failover functions

To use the Failover functions of ClusterReplica SQL 3.0, users need to configure **Failover Setup** with user-defined cluster name and pre-set cluster IP.
(see next section)

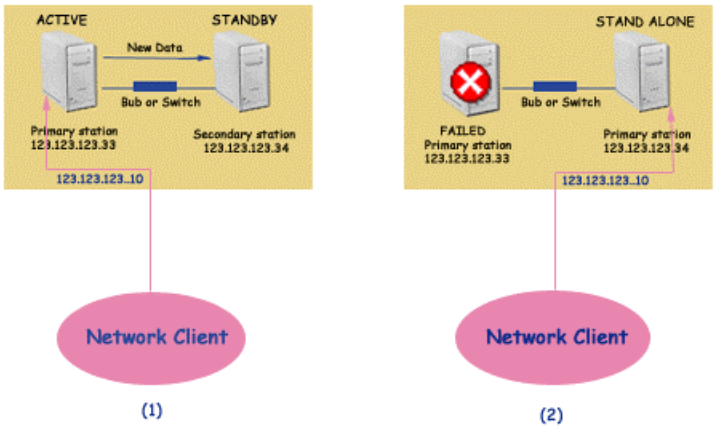
**Failover triggering events**

1. **Receives no response during keep-alive period** - The Secondary station monitors the active state of the Primary station in a pre-set duration of time. The default setting of the keep-alive period is 15 seconds. Users can make adjustments to this time period for ClusterReplica SQL 3.0 to determine when to Exercise Failover
2. **Monitored services malfunction or fail to start** - when any one of the monitored services defined is detected in malfunction, failover will be activated
3. **Public connection network adapter fails to function** - when the public connection to the Primary station fails either due to network card malfunction or the disconnection of the network cable, failover will be activated

**Case 1: Receives no response during keep-alive period.**

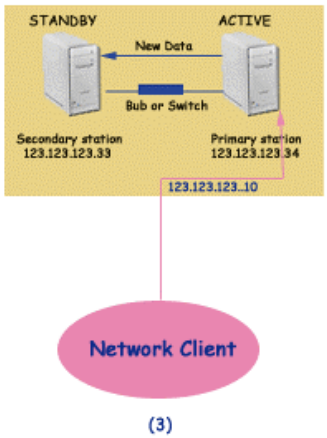
In this situation, the Primary station is completely out of the cluster server and the Secondary station is to operate as standalone server until the Primary station is plugged back to the cluster server. Following pictures present the situation graphically where the two systems in the yellow frame make up the cluster server.

1. Picture (1) shows a normal working situation of the cluster server.
2. Picture (2) shows the situation after a Failover.




**Case 2: Monitored service malfunction or fail to start**

In this situation, one of the monitored services is detected of malfunction, but everything else are working just fine. ClusterReplica SQL 3.0, on detecting the service error, will automatically switch the roles of active/standby stations while both systems are still running. Following picture give the general sense of the situation.




**An Example**: The SQL service on the Primary station stopped for some reason. However, all other applications are working normally.

ClusterReplica SQL 3.0 detected the failure of SQL service on the Primary station. It starts the SQL service on the Secondary station immediately and checks on all services in the **monitored service list** making sure they are also started on the Secondary station. At this point, the Secondary station takes up the active role and the original Primary and Secondary stations in the cluster server switched positions.

This switch of roles is done without network clients' notice. The system Admin can then work on the standby station to figure out what went wrong with the SQL server on it.

### 4.12 Not using the Failover functions

When use ClusterReplica SQL 3.0 for the real-time data replication purpose only, the Failover/Failback functions are not configured. This is the default setting of ClusterReplica SQL 3.0 with the successful installation of the software on both Primary and Secondary stations.

Users need only to configure the data replication and, the backup utility if scheduled routine backup is also desired.

## 4.2 Failback or Not Failback

The main reason that some users want to Failback is that of the two clustering systems, the one used for the Primary station is more robust then the one used for the Secondary station. Failback will keep the more robust system be the active server as much as it can.

**Notice that**, if the two systems in the cluster server are comparable in hardware components and configuration, let the Primary station "float" between the servers without Failback can be equally efficient.

### 4.21 ClusterReplica SQL 3.0 offers two ways to Failback

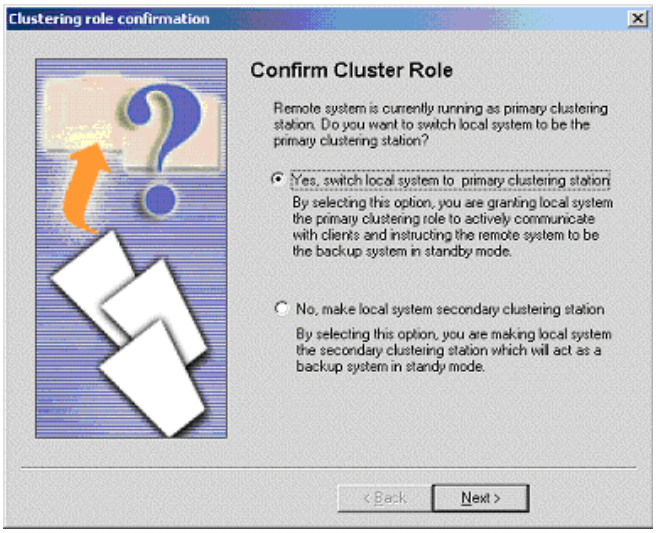
1. **Automatic Failback** - Failback is to take place as soon as the newly-started server is reconnected to the cluster server. No human intervention is required with this Failback method.

2. **Confirmed Failback** - The newly-started server will first take up the standby role to allow current data to be copied over, then failback. Users will be prompted to confirm each step of motion.

   If users decide to not failback, they can check **No** in the confirmation process. With this action, ClusterReplica SQL 3.0 will keep the current active station to be the Primary station until the cluster server failover again.

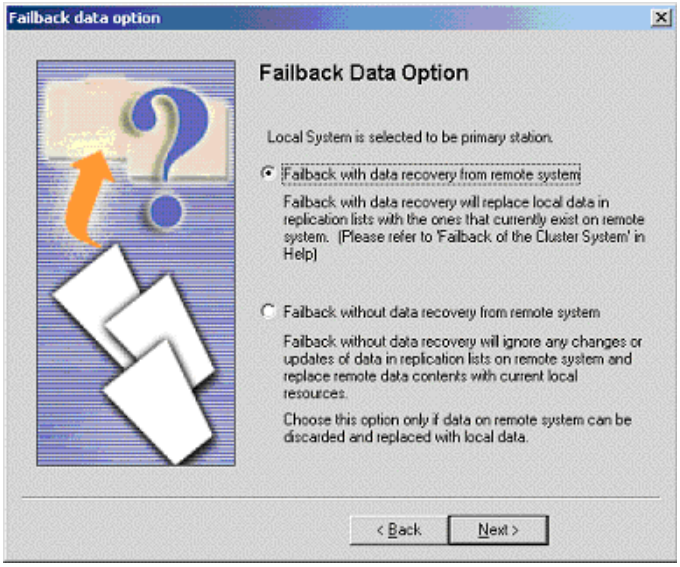
► Here is an example of confirmed Failback. The newly-start system is plugged into the cluster server and the dialog box for user confirmation comes up.

- In following picture, **Yes, switch local system to Primary station** is selected. If select the other setting, the newly-start system will remain to be the Secondary station when the file sync process completes.


Clustering role confirmation
Confirm Cluster Role
Remote system is currently running as primary clustering station. Do you want to switch local system to be the primary clustering station?
Yes, switch local system to primary clustering station
By selecting this option, you are granting local system the primary clustering role to actively communicate with clients and instructing the remote system to be the backup system in standby mode.
No, make local system secondary clustering station
By selecting this option, you are making local system the secondary clustering station which will act as a backup system in standy mode.
< Back
Next >

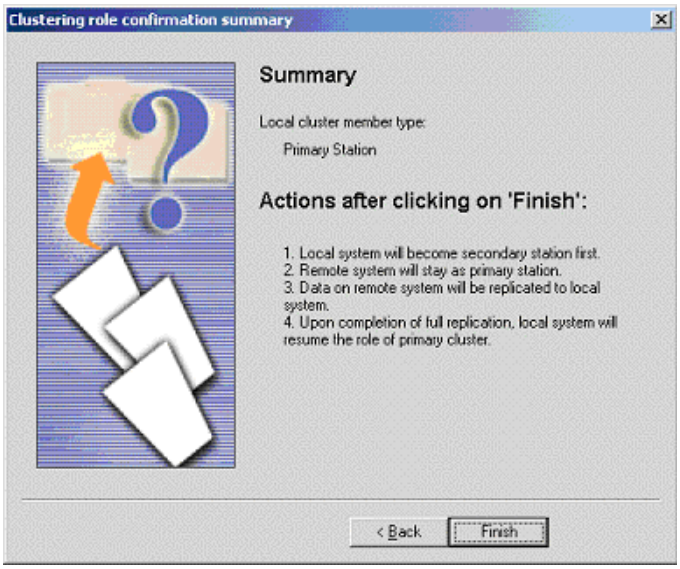
- In the next picture, you have the choice of having the data on the current active standalone station copied over to the newly-start server, or not having it copied over. In most common situation, you would want the data to be copied over because the active server should always have the most current data.

In our example, **Failback with data recovery from remote system** is selected.


Failback data option
Failback Data Option
Local System is selected to be primary station.
Failback with data recovery from remote system
Failback with data recovery will replace local data in replication lists with the ones that currently exist on remote system. (Please refer to 'Failback of the Cluster System' in Help)
Failback without data recovery from remote system
Failback without data recovery will ignore any changes or updates of data in replication lists on remote system and replace remote data contents with current local resources.
Choose this option only if data on remote system can be discarded and replaced with local data.
< Back
Next >

- The next picture shows the **Summary** page which tells you that you have choose to let the newly-start server to become the Primary station and have the current data on the active standalone station will be copied over.

If this is not what you really wanted, click on **Back** to go to the previous pages to make the changes.


Clustering role confirmation summary
Summary
Local cluster member type:
Primary Station
Actions after clicking on 'Finish':
1. Local system will become secondary station first.
2. Remote system will stay as primary station.
3. Data on remote system will be replicated to local system.
4. Upon completion of full replication, local system will resume the role of primary cluster.
< Back
Finish

## 4.22 Advantage and disadvantages in each of the Failback method

**Advantages:**

- **The automatic Failback** is simple and hassle-free to always keeping the original Primary station to be the active server.

  Some users prefer this way because they use a heavy-duty machine to run the Primary station, but only use an average machine for the backup. Naturally, they would prefer to use the original Primary to be the active server as much as possible.

  Automatic Failback will, without confirmation, first copy all current data on the standalone server, and then switch the roles.

- **The confirmed Failback** guarantees no mistakes on data overwritten.

  In some special circumstances, the newly-started server may contain the data users wanted. Users then may want to copy the data on the newly-started server to the standalone server, instead of the other way around as normal Failover will do. Manual Failback gives you the full control of in which direction you want the data to flow.

**Disadvantages:**

- **The automatic Failback** - In some special situations, the newly-start server may contain the data users want to keep. If automatic failover is set on the cluster server, this data will be overwritten as soon as the system is connected into the clustering. This accidental loss of data then becomes inevitable then.

- **The confirmed Failback** requires a person to sit in front of the server and make decisions on each move of the configuration for the right result. This process can be tedious and cause error by human mistakes.

# CHAPTER 5

# Cluster Configuration

This chapter provides details on concept of clustering in ClusterReplica SQL 3.0 and the configuration procedures. The two sections in **Cluster Configuration** are:

1) **Replication Setup** – deals with the data replication communications between the clustered servers
2) **Failover Setup** – deals with the public connection of network clients to the server and the cluster failover between the clustered servers

ClusterReplica SQL 3.0 binds two Windows systems together to make up the cluster server. During normal operation, the Primary station is responsible for servicing the network clients and replicate the new data to the Secondary station in real time so that all data on the Secondary station will be current within minutes.

The Secondary station while remain hidden from the network clients is standby and ready to take over the active role should the Primary station fails for any reason. Meanwhile, managers can extract data from it for routine checkup or making periodic reports without interfere the public service job of the cluster server.

## 5.1 Replication Setup

This part of the **Cluster Configuration** configures the cluster server sets data replication and file sync routines.

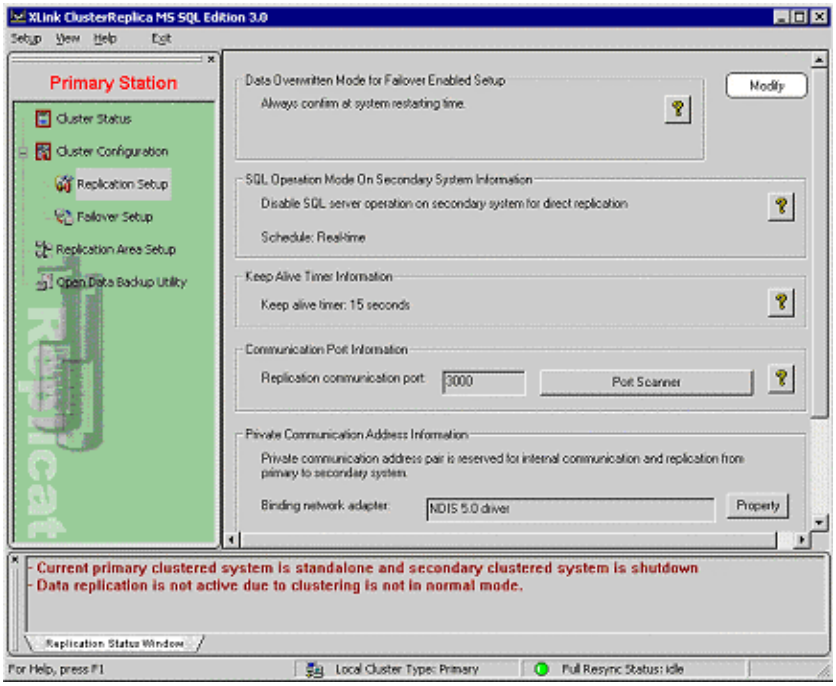
A little different from Failover Setup, **Replication Setup** allows some items of the configuration to be done on both Primary and Secondary stations. To be specific, the only item that cannot be changed on the Secondary station, in this part of configuration, is to set SQL operation mode.

**This design requires special attention to following:**

1. The **communication port** and **communication addresses must match** on both Primary and Secondary stations. Changes made on one system must also be done one the other system.

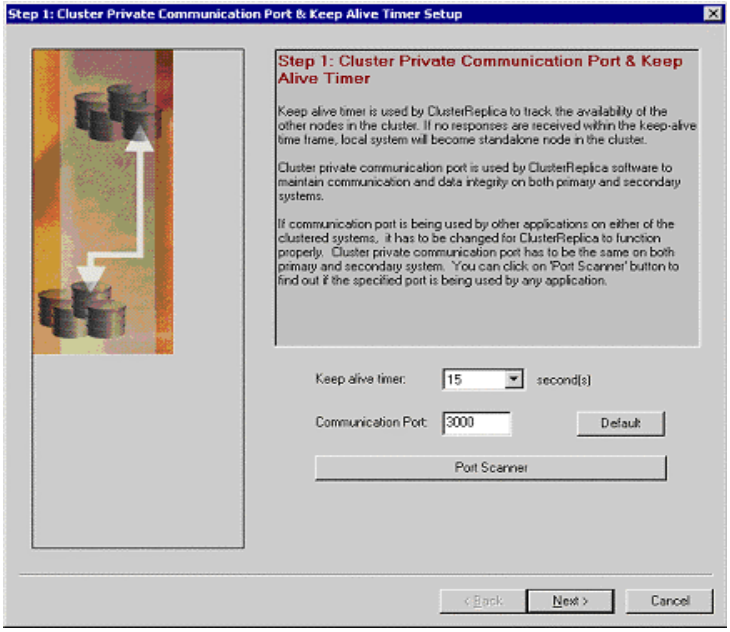
2. **The keep alive time** is the length of time by which a system determines if the other system is still alive. Because this value is system and network traffic dependent, it can be set of different values on the Primary and Secondary stations.

3. The **Data overwritten protection** can also be set individually on Primary and Secondary stations. When the check box is checked, it means at the restart of the local system, confirmation on overwritten of local data files will come up before action is taken.


XLink ClusterReplica MS SQL Edition 3.0
Setup View Help Exit
Primary Station
Cluster Status
Cluster Configuration
Replication Setup
Failover Setup
Replication Area Setup
Open Data Backup Utility
Data Overwritten Mode for Failover Enabled Setup
Always confirm at system restarting time.
Modify
SQL Operation Mode On Secondary System Information
Disable SQL server operation on secondary system for direct replication
Schedule: Real-time
Keep Alive Timer Information
Keep alive timer: 15 seconds
Communication Port Information
Replication communication port: 3000
Port Scanner
Private Communication Address Information
Private communication address pair is reserved for internal communication and replication from primary to secondary system.
Binding network adapter: NDIS 5.0 driver
Property
Current primary clustered system is standalone and secondary clustered system is shutdown
Data replication is not active due to clustering is not in normal mode.
Replication Status Window
For Help, press F1
Local Cluster Type: Primary
Full Resync Status: Idle

Click **Modify** to begin the configuration process. Any change involve data replication must go through the entire process to complete.

►This first page shows two items:


Step 1: Cluster Private Communication Port & Keep Alive Timer Setup
Step 1: Cluster Private Communication Port & Keep Alive Timer
Keep alive timer is used by ClusterReplica to track the availability of the other nodes in the cluster. If no responses are received within the keep-alive time frame, local system will become standalone node in the cluster.
Cluster private communication port is used by ClusterReplica software to maintain communication and data integrity on both primary and secondary systems.
If communication port is being used by other applications on either of the clustered systems, it has to be changed for ClusterReplica to function properly. Cluster private communication port has to be the same on both primary and secondary system. You can click on 'Port Scanner' button to find out if the specified port is being used by any application.
Keep alive timer: 15 second(s)
Communication Port: 3000
Default
Port Scanner
< Back
Next >
Cancel

1. **Keep alive time** - this is the time which helps the local system to determine whether the remote system is still alive. The default time duration for **Keep alive time** is 15 seconds. This means at the end of each 15 seconds, if no response from the remote system is detected by the local system, local system will begin to operate in standalone mode.

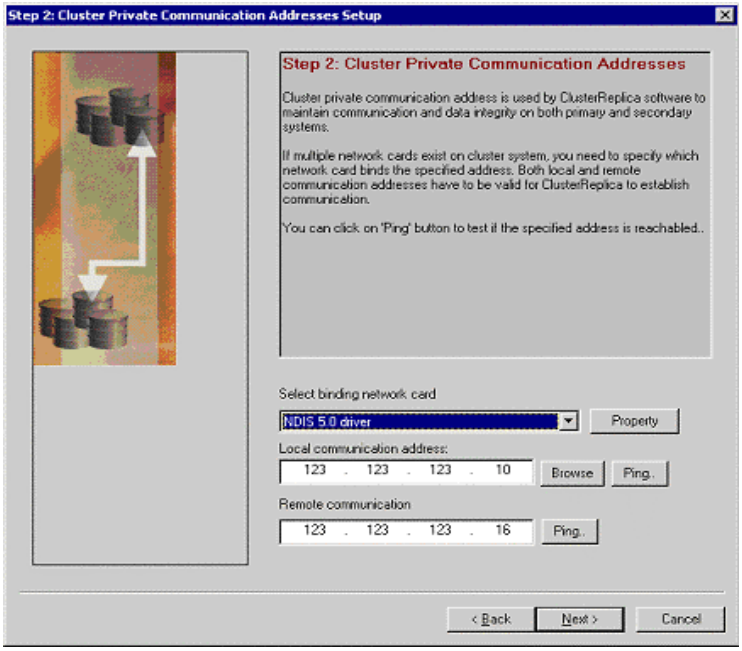
   The general rule of thumb is: the faster the system's processing speed or busier the network traffic into the local system, the longer the **Keep alive time** should be set.

   Two things could happen when "death" is detected in a clustered system:
   - When the Primary station detected the Secondary station is "dead", data replication function will stop.
   - When the Secondary station detected the Primary station is "dead", it will assume the active role of the cluster server and function in standalone mode.

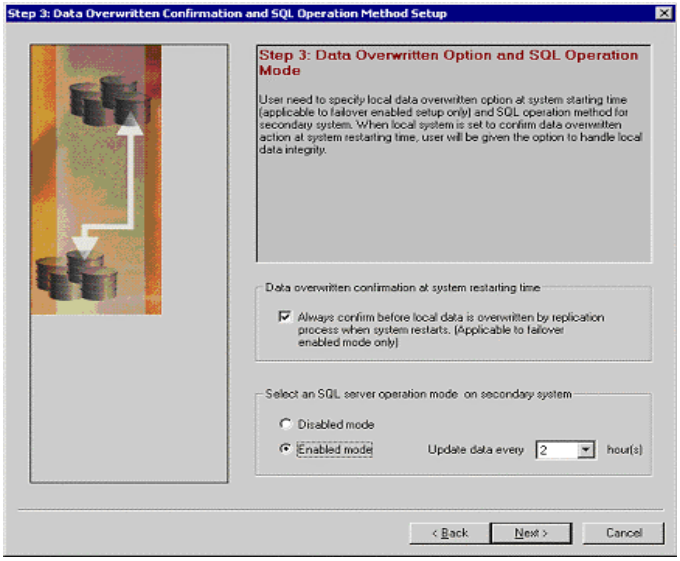
2. **Communication port** - users can also change the communication port, but be sure that the port number defined on both Primary and Secondary stations are the same when changes are made.

► The next page is to setup IP numbers for internal communication of the cluster server. Use the drop down menu to select the network card that has the IP number you want to use for this purpose.

**Make sure the IP numbers on local and remote systems matches on the Primary and Secondary stations.**


Step 2: Cluster Private Communication Addresses Setup
Step 2: Cluster Private Communication Addresses
Cluster private communication address is used by ClusterReplica software to maintain communication and data integrity on both primary and secondary systems.
If multiple network cards exist on cluster system, you need to specify which network card binds the specified address. Both local and remote communication addresses have to be valid for ClusterReplica to establish communication.
You can click on 'Ping' button to test if the specified address is reachabled..
Select binding network card
NDIS 5.0 driver
Property
Local communication address:
123 . 123 . 123 . 10
Browse
Ping..
Remote communication
123 . 123 . 123 . 16
Ping..
< Back
Next >
Cancel

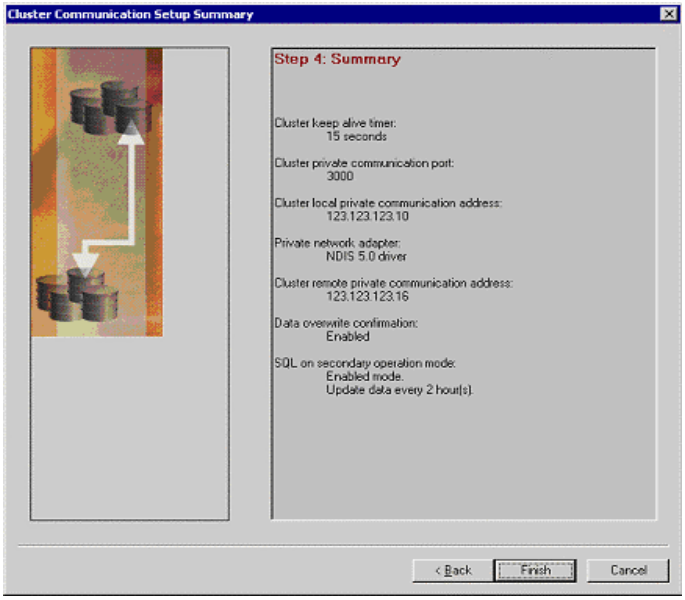
► The next page contains two sections of configuration:


Step 3: Data Overwritten Confirmation and SQL Operation Method Setup
Step 3: Data Overwritten Option and SQL Operation Mode
User need to specify local data overwritten option at system starting time (applicable to failover enabled setup only) and SQL operation method for secondary system. When local system is set to confirm data overwritten action at system restarting time, user will be given the option to handle local data integrity.
Data overwritten confirmation at system restarting time
Always confirm before local data is overwritten by replication process when system restarts. (Applicable to failover enabled mode only)
Select an SQL server operation mode on secondary system
Disabled mode
Enabled mode
Update data every 2 hour(s)
< Back
Next >
Cancel

1. **Data overwritten protection** - this option lets you decide if you want to be prompt at every restart of the local system for file overwritten.
    - Check the box means: **yes, please ask me before any file sync takes place**.
    - Leaving the box unchecked means: **no, please don't bother**.

2. **Select a SQL operation mode** - the two selections sets the SQL service on the Secondary station in **Disabled** mode or **Enabled** mode. In enabled mode, the Secondary station would allow users to access and view database.

► This next page is the summary of the user configuration. If more changes are to be made, click **Back**. Otherwise, click **Finish** to complete the configuration process.



## 5.2 Failover Setup

This section deals with the setup of the **public connection** and the **cluster Failover** settings. Because some of the configuration selections depend on users' system environment, some general consideration of network design are listed below for user reference.

### 5.21 Network Configuration Concerning Failover

The three concepts that involve Failover in ClusterReplica SQL 3.0 are:

1. ***Cluster Name*** - the name which network clients use to connect to the Primary station
2. ***Cluster IP*** - the IP address which network clients use to connect to the Primary station
3. ***DNS setup*** – the cross network configuration for failover

The two types of network configuration established on above concepts that concern cluster Failover using ClusterReplica SQL 3.0. are:

1. The clustered systems are in same network segment
2. The clustered systems are in different network segment

**The most important** condition being that the clustered systems must **not** be the domain controller or the DNS server.

The Failover setup considerations are summed up in following:

**When both Primary and Secondary stations are in the same network segment**

In this system environment, three situations can be considered:

1. **Local host table or IP address is used** - the Cluster IP must be set
2. **MS Netbios is used to resolve network address** - the Cluster Name must be set
3. **DNS is configured** - the Cluster Name and Cluster IP can be optional.

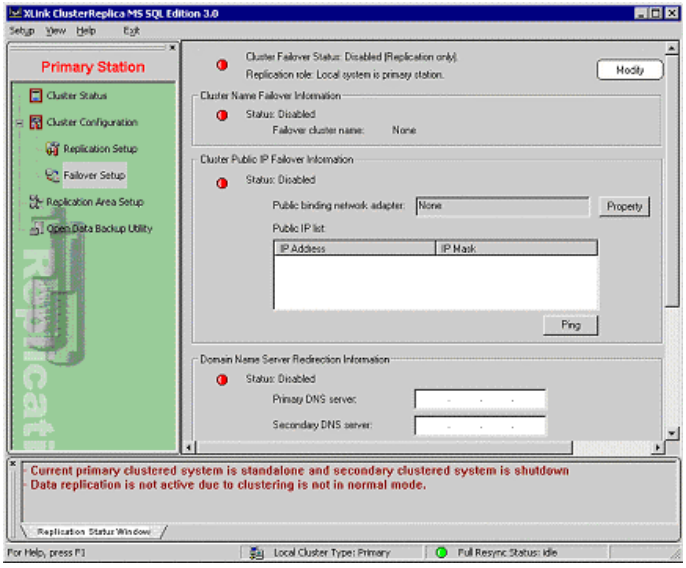
In the case where all three situations listed above are involved, users need to setup the Cluster Name, Cluster IP, and the DNS configuration in Failover setup.

**When the Primary and Secondary stations are in different network subnet**

In this system environment, **only** DNS configuration can be used for Failover setup. Enable Cluster Name or Cluster IP may result failure of cluster Failover.

## 5.22 Configure Failover Setup

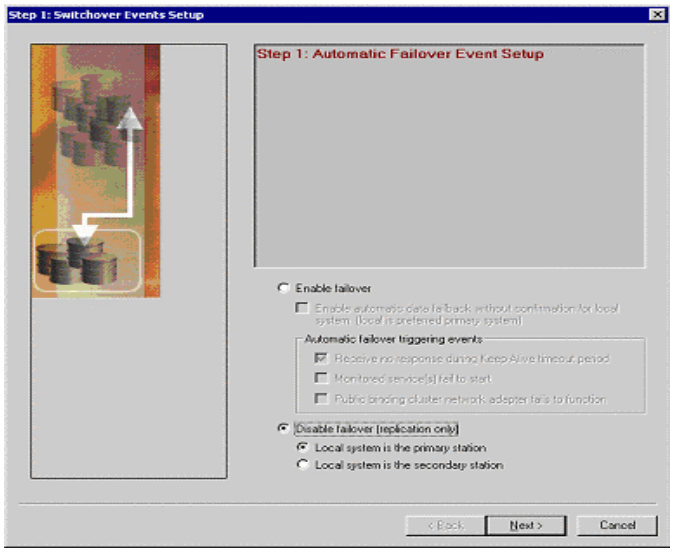
From the main menu, select **Failover Setup** to bring up the configuration panel. To begin configuration process, click **Modify**.



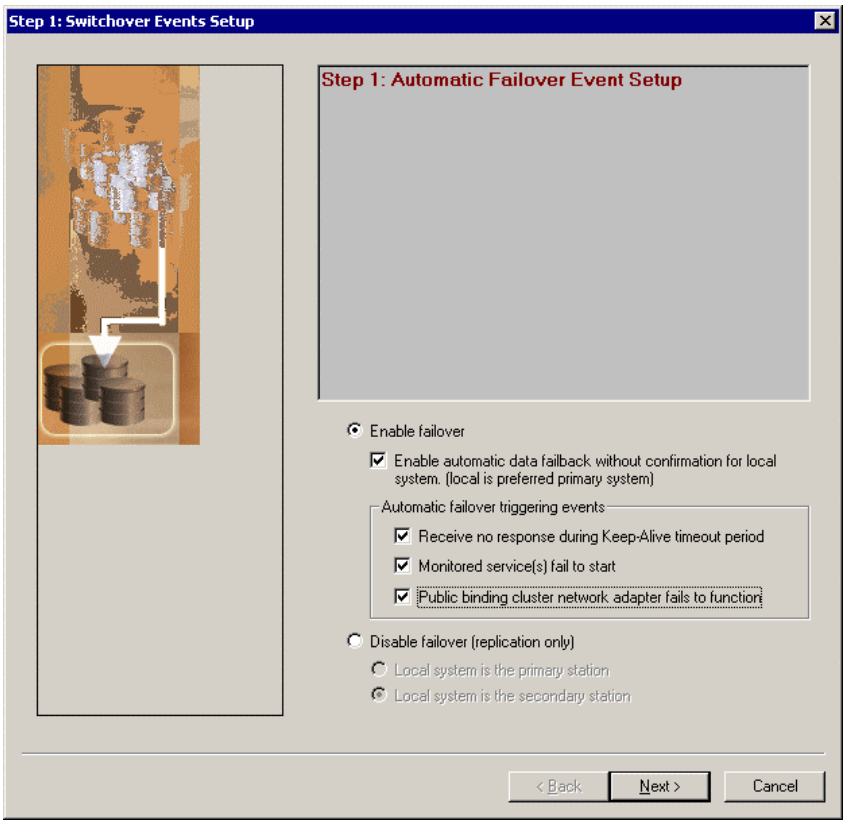

► The first screen presents the default setting of the cluster server which sets the **Failover/Failback** functions disabled. The cluster server is now in **replication only** mode.

When in **replication only** mode, the Primary and Secondary stations are fixed with their status, that is once set Primary, a server will always hold the Primary status in the cluster system.

The selection for **Primary** and **Secondary** stations can only be done when Failover is disabled. This setting is used for **replication only** mode only to determine the data flow direction.

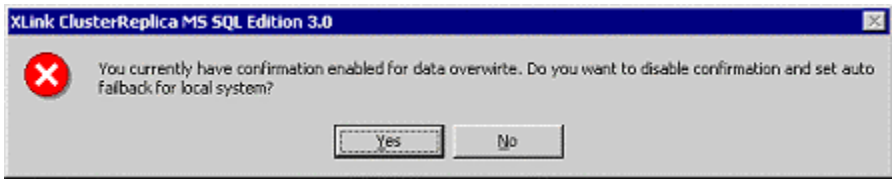

Step 1: Switchover Events Setup
Step 1: Automatic Failover Event Setup
Enable failover
Automatic failover triggering events
Disable failover (replication only)
Local system is the primary station
Local system is the secondary station
< Back
Next >
Cancel

By select **Enable Failover**, ClusterReplica SQL 3.0 enables Failover/Failback functions. The cluster server is no longer in **replication only** mode.

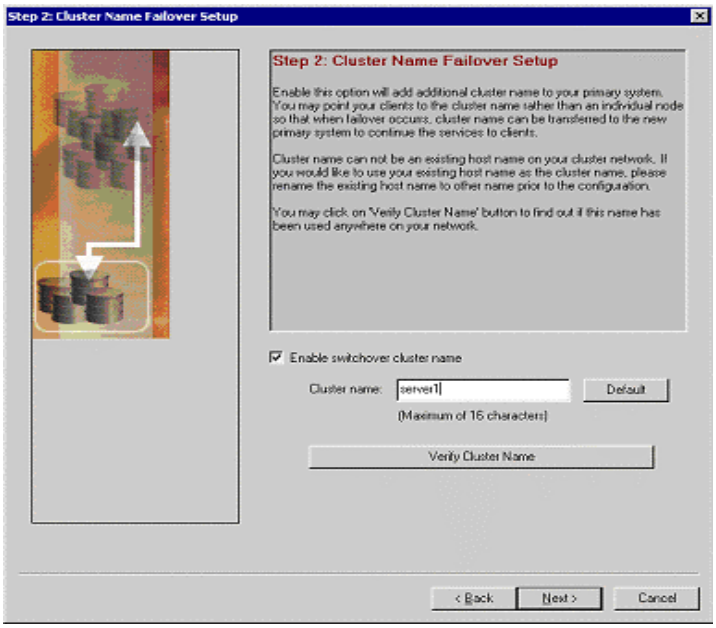

Step 1: Switchover Events Setup
Step 1: Automatic Failover Event Setup
Enable failover
Enable automatic data failback without confirmation for local system. (local is preferred primary system)
Automatic failover triggering events
Receive no response during Keep-Alive timeout period
Monitored service(s) fail to start
Public binding cluster network adapter fails to function
Disable failover (replication only)
Local system is the primary station
Local system is the secondary station
< Back
Next >
Cancel

### Set Automatic Failback

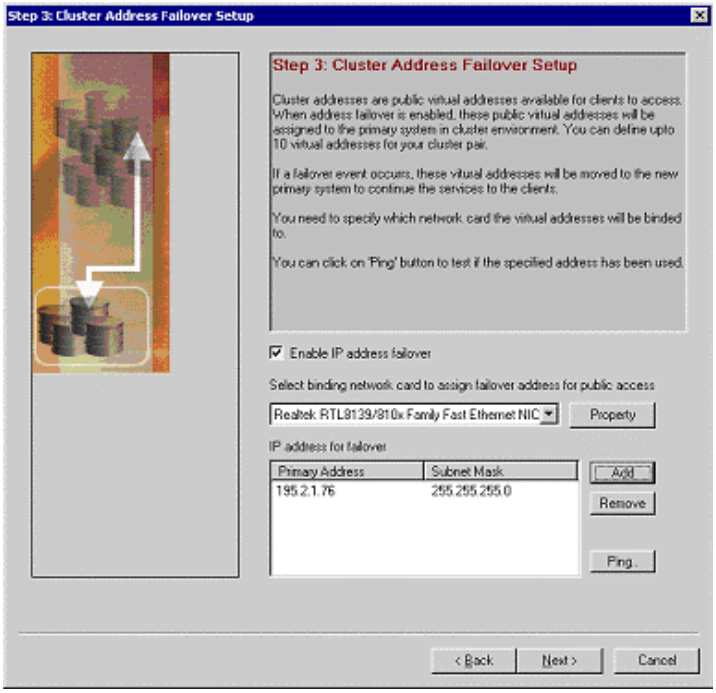
If the box **Enable automatic data failback...** (in above picture) is checked, automatic Failback will take place. A warning as shown in next picture should come up to remind you no further confirmation will be checked before data overwritten. Leave this box unchecked means manual Failback is in place.


XLink ClusterReplica MS SQL Edition 3.0
You currently have confirmation enabled for data overwirte. Do you want to disable confirmation and set auto failback for local system?
Yes
No

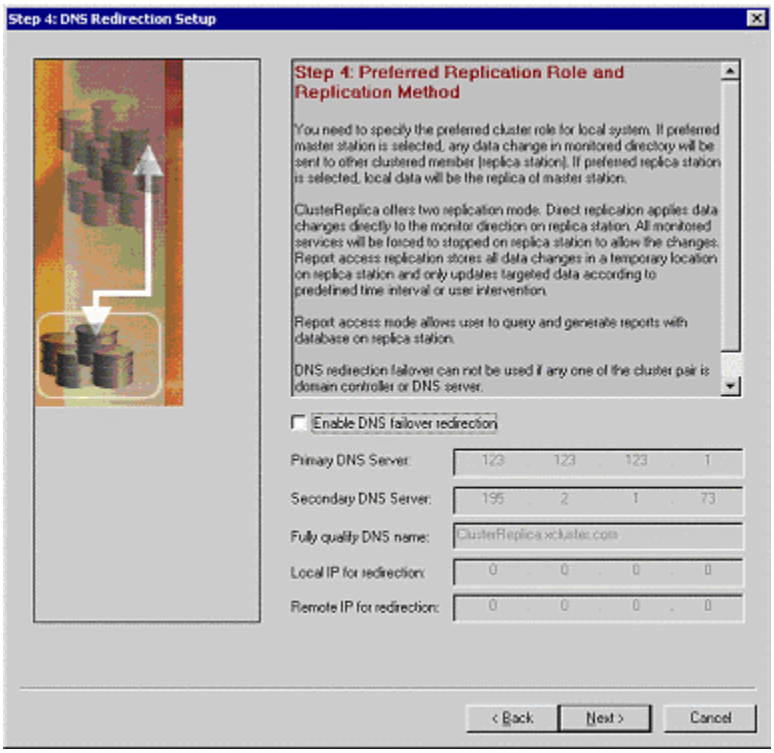
► The next step is to give the cluster server a name for the cluster server. This is normally the name of the SQL server, but it cannot be the Windows system name. (If **DNS** setup is configured, this cluster name can be optional.)


Step 2: Cluster Name Failover Setup
Step 2: Cluster Name Failover Setup
Enable this option will add additional cluster name to your primary system. You may point your clients to the cluster name rather than an individual node so that when failover occurs, cluster name can be transferred to the new primary system to continue the services to clients.
Cluster name can not be an existing host name on your cluster network. If you would like to use your existing host name as the cluster name, please rename the existing host name to other name prior to the configuration.
You may click on 'Verify Cluster Name' button to find out if this name has been used anywhere on your network.
Enable switchover cluster name
Cluster name:
server1
Default
(Maximum of 15 characters)
Verify Cluster Name
< Back
Next >
Cancel

► The next step is to define the cluster IP. This is the IP that is to be attached to the Primary station of the cluster server for network clients to connect to the server. If you have more than one network cards in the system, use the drop down menu to select the card with the IP you wanted.
(If **DNS** setup is configured, this cluster IP can be optional.)


Step 3: Cluster Address Failover Setup
Step 3: Cluster Address Failover Setup
Cluster addresses are public virtual addresses available for clients to access. When address failover is enabled, these public virtual addresses will be assigned to the primary system in cluster environment. You can define upto 10 virtual addresses for your cluster pair.
If a failover event occurs, these virtual addresses will be moved to the new primary system to continue the services to the clients.
You need to specify which network card the virtual addresses will be binded to.
You can click on 'Ping' button to test if the specified address has been used.
Enable IP address failover
Select binding network card to assign failover address for public access
Realtek RTL8139/810x Family Fast Ethernet NIC
Property
IP address for failover
Primary Address
Subnet Mask
195.2.1.76
255.255.255.0
Add
Remove
Ping...
< Back
Next >
Cancel

♦ If no DNS setup is needed, leave the box unchecked.


Step 4: DNS Redirection Setup
Step 4: Preferred Replication Role and Replication Method
You need to specify the preferred cluster role for local system. If preferred master station is selected, any data change in monitored directory will be sent to other clustered member (replica station). If preferred replica station is selected, local data will be the replica of master station.
ClusterReplica offers two replication mode. Direct replication applies data changes directly to the monitor direction on replica station. All monitored services will be forced to stopped on replica station to allow the changes. Report access replication stores all data changes in a temporary location on replica station and only updates targeted data according to predefined time interval or user intervention.
Report access mode allows user to query and generate reports with database on replica station.
DNS redirection failover can not be used if any one of the cluster pair is domain controller or DNS server.
Enable DNS failover redirection
Primary DNS Server:
Secondary DNS Server:
Fully quality DNS name:
Local IP for redirection:
Remote IP for redirection:
< Back
Next >
Cancel

♦ If DNS configuration is needed, following conditions require special attention.

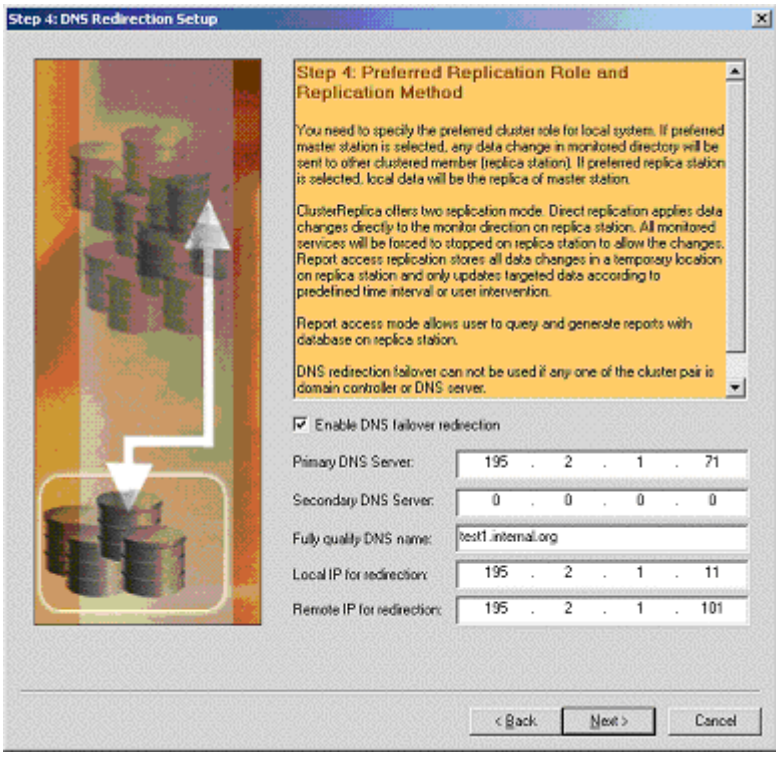
**The most important** condition being that the clustered systems must **not** be the domain controller or the DNS server.

**Other issues** involve DNS configurations are:

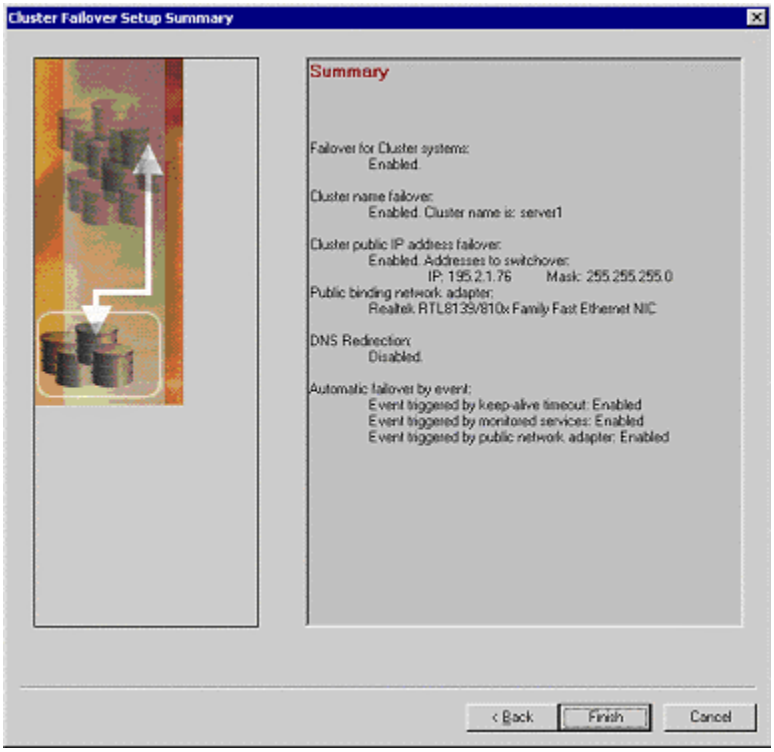
1. Users **must** be able to authorize DNS dynamic update

2. When **Cluster IP** (in Failover setup step 2) is enabled, the network card that is binding the Cluster IP must check off "Register this connection's addresses in DNS" in the Advanced TCP/IP settings. This must be done on both Primary and Secondary stations.

The first step in enable DNS setup is to check the box **Enable DNS Failover Redirection**. Following is an example on DNS configuration.


Step 4: DNS Redirection Setup
Step 4: Preferred Replication Role and Replication Method
You need to specify the preferred cluster role for local system. If preferred master station is selected, any data change in monitored directory will be sent to other clustered member (replica station). If preferred replica station is selected, local data will be the replica of master station.
ClusterReplica offers two replication mode. Direct replication applies data changes directly to the monitor direction on replica station. All monitored services will be forced to stopped on replica station to allow the changes. Report access replication stores all data changes in a temporary location on replica station and only updates targeted data according to predefined time interval or user intervention.
Report access mode allows user to query and generate reports with database on replica station.
DNS redirection failover can not be used if any one of the cluster pair is domain controller or DNS server.
Enable DNS failover redirection
Primary DNS Server: 195 . 2 . 1 . 71
Secondary DNS Server: 0 . 0 . 0 . 0
Fully qualify DNS name: test1.internal.org
Local IP for redirection: 195 . 2 . 1 . 11
Remote IP for redirection: 195 . 2 . 1 . 101
< Back
Next >
Cancel

Here is the summary page to show you the complete setup. If there is anything you want to change, click **Back** to make the changes. Otherwise, click **Finish** to complete the process.



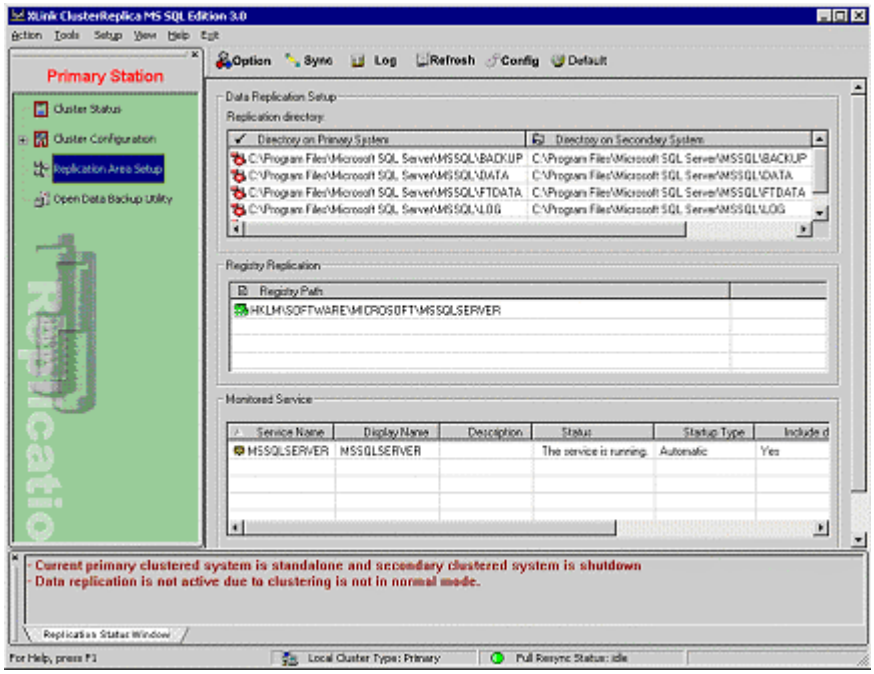
# Replication Area Configuration

The file replication function of ClusterReplica SQL 3.0 is among the most powerful and efficient in its class. Besides handling all types of files, including SQL database files and some registry files, ClusterReplica SQL 3.0 replicates files in real time even when the file is open and being used.

With successful installation, ClusterReplica SQL 3.0 is set by default in **Replication only** mode with automatic configuration to replicate MS SQL database files (on SQL server's default settings).

## 6.1 Data Replication Setup

Select **Replication Area Setup"** from the main menu, the configuration panel will look like following picture.

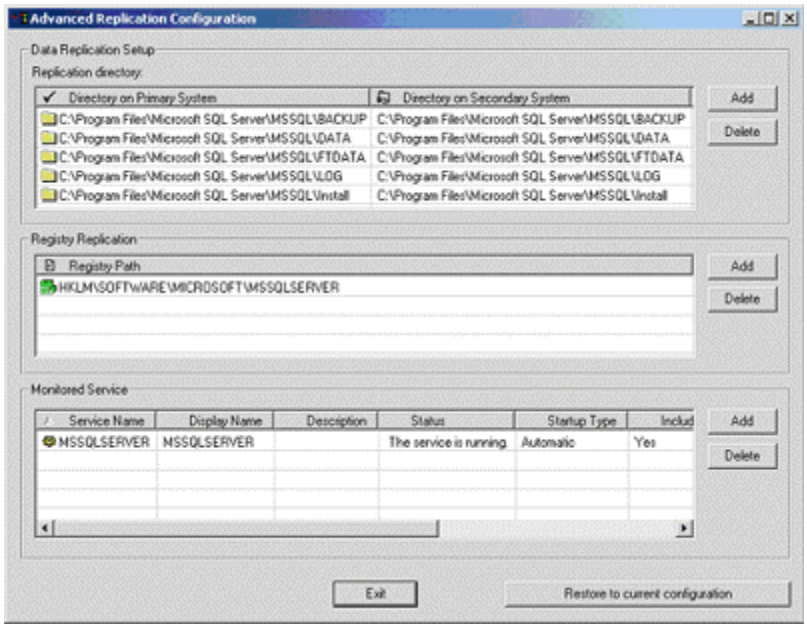



The "stuff" in each section of this panel are the files and services needed for ClusterReplica SQL 3.0 to correctly replicate all your SQL database files from the Primary station to the Secondary station at normal times, and activate Failover process when a service or system failure is detected.

Other files and services to be replicated and monitored can be added by click the **config** button on the tool bar.

Click **Add** by each section to add

1) File path for data replication
2) Dynamically created registry files
3) Services to be monitored for failover




In detail, these sections can be described as following:

**Data Replication Setup** - Add all files and folders of files to be replicated from the Primary station to the Secondary station here. If a file requires an application to access, the application/service must be added in the **Monitored Service** section.

**Registry Replication** - The Registry Replication functionality meets the needs of some server systems which require certain dynamically changed key definitions of registry matched on the Secondary server for a successful failover.

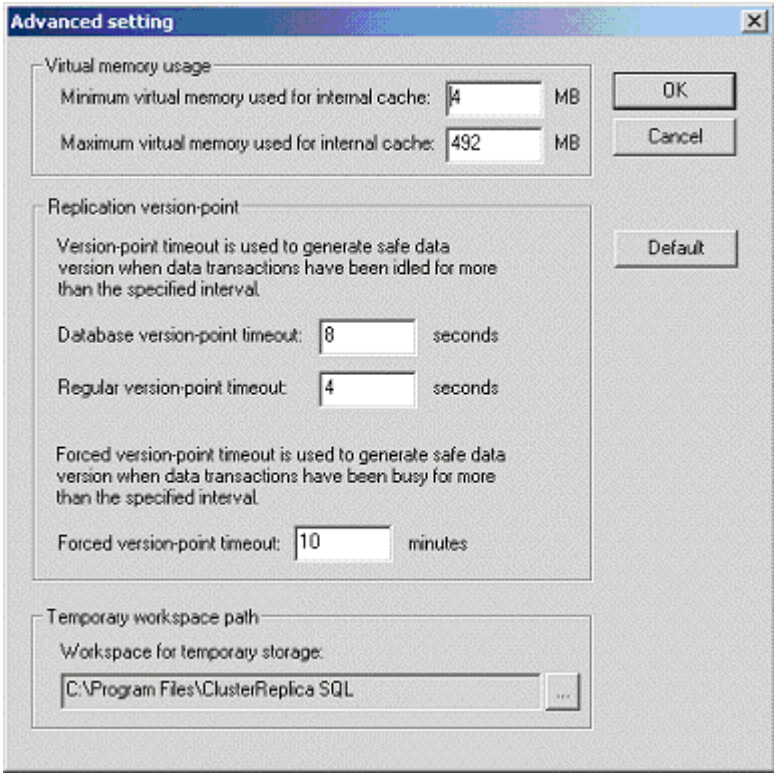
**Warning:** Do not replicate the entire registry - replicate only the keys for specific applications.

**Monitored Service** - All files that need specific application to access (for example, the database files require SQL application to access), would require to have the application service to be added in this listing so that when failover takes place, these services will be activated on the Secondary station. These services are also monitored for service level failover which will happen when any one of the services in the list is detected of malfunction.

## 6.2 Replication Advanced Settings

ClusterReplica SQL 3.0 replicates modified data of database files and non-database files in the point-in-time fashion. With successful installation, some default values of memory space allocation and timing arrangement for data replication operation are set as recommended values for best performance.

Users, however, still have the power to change these values to best fit their system environment. This flexibility promises the highest product efficiency and user satisfaction.




**Explanations of the values and their consequences.**

1. **Virtual memory usage** - the virtual memory allocated here is for ClusterReplica data replication internal process use. More memory allocated here, the better performance for ClusterReplica data replication. However, too much memory used by this one application may hinder performance of other applications. So, balanced setting is recommended.

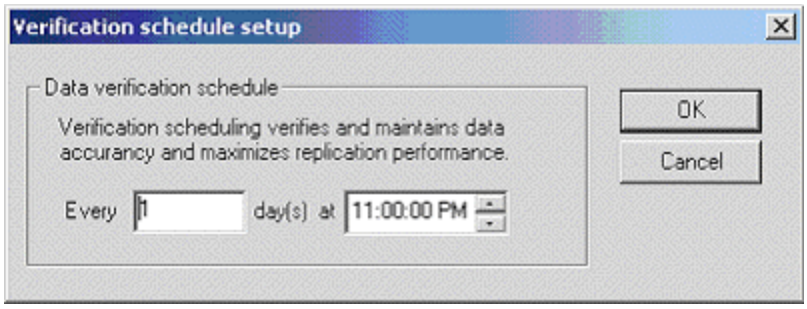
2. **Replication Version-point** - values included in this section are related to how often a new batch of data is to be transported from the Primary station to the Secondary station.

    - Database version-point time out - this value indicates that data transport for database files takes place at every eight seconds.
    - Regular version-point timeout - this value indicates that data transport for non-database files takes place at every four seconds.
    - Forced version-point timeout - This value indicates that if there is a non-stop in-flow of new data, ClusterReplica SQL 3.0 will force a break on the data in-flow and perform the data transport at every ten minutes.

3. **Temporary workspace path** - this location is where ClusterReplica store temporary files during operation. If large database files are to be replicated and **report mode** is activated, a large space for this temporary workspace may be needed. Users can change the location to a different drive for this consideration.

## 6.3 Replication Verification Schedule

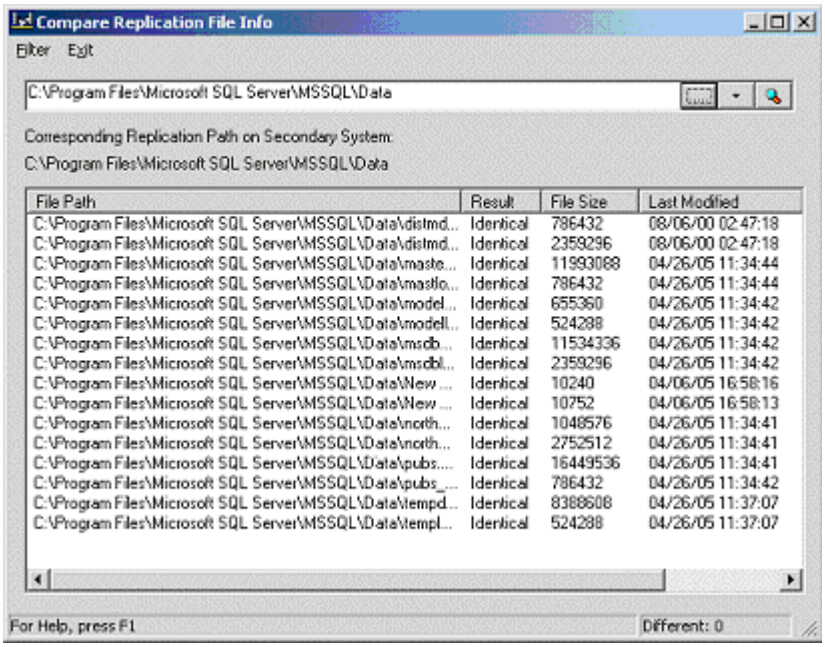
ClusterReplica SQL 3.0 can run automatic data replication verifications which will auto update files on the Secondary system whose file dates or file size does not match that on the Primary system. The default set on this data replication verification is as shown. You can change the verification schedule according to your needs.



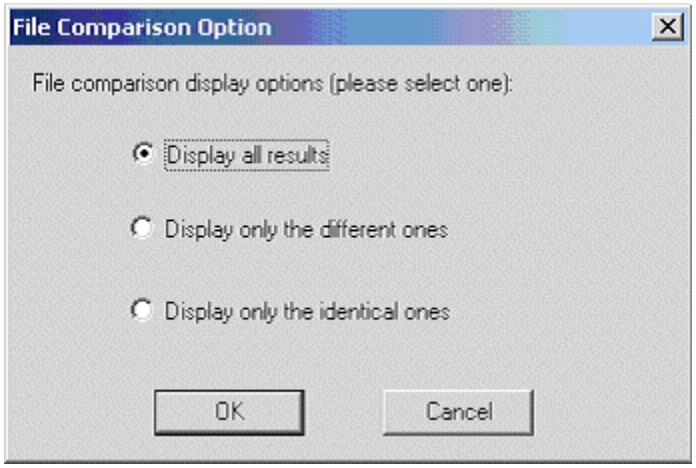
## 6.4 Compare replication file info

The **Compare Replication File Info** tool allows you to manually check up the folders and files in the **File Replication** definitions to make sure all files are copied properly from the Primary server to the Secondary server.

When in **File Replication Setup**, click button **Advanced** on the menu bar to find **Compare File Info** to open up the processing screen as shown below.


Compare Replication File Info
Filter Exit
C:\Program Files\Microsoft SQL Server\MSSQL\Data
Corresponding Replication Path on Secondary System:
C:\Program Files\Microsoft SQL Server\MSSQL\Data
File Path | Result | File Size | Last Modified
C:\Program Files\Microsoft SQL Server\MSSQL\Data\distmd... Identical 786432 08/06/00 02:47:18
C:\Program Files\Microsoft SQL Server\MSSQL\Data\distmd... Identical 2359296 08/06/00 02:47:18
C:\Program Files\Microsoft SQL Server\MSSQL\Data\maste... Identical 11993088 04/26/05 11:34:44
C:\Program Files\Microsoft SQL Server\MSSQL\Data\mastlo... Identical 786432 04/26/05 11:34:44
C:\Program Files\Microsoft SQL Server\MSSQL\Data\model... Identical 655360 04/26/05 11:34:42
C:\Program Files\Microsoft SQL Server\MSSQL\Data\modell... Identical 524288 04/26/05 11:34:42
C:\Program Files\Microsoft SQL Server\MSSQL\Data\msdb... Identical 11534336 04/26/05 11:34:42
C:\Program Files\Microsoft SQL Server\MSSQL\Data\msdbl... Identical 2359296 04/26/05 11:34:42
C:\Program Files\Microsoft SQL Server\MSSQL\Data\New ... Identical 10240 04/06/05 16:58:16
C:\Program Files\Microsoft SQL Server\MSSQL\Data\New ... Identical 10752 04/06/05 16:58:13
C:\Program Files\Microsoft SQL Server\MSSQL\Data\north... Identical 1048576 04/26/05 11:34:41
C:\Program Files\Microsoft SQL Server\MSSQL\Data\north... Identical 2752512 04/26/05 11:34:41
C:\Program Files\Microsoft SQL Server\MSSQL\Data\pubs.... Identical 16449536 04/26/05 11:34:41
C:\Program Files\Microsoft SQL Server\MSSQL\Data\pubs_... Identical 786432 04/26/05 11:34:42
C:\Program Files\Microsoft SQL Server\MSSQL\Data\tempd... Identical 8388608 04/26/05 11:37:07
C:\Program Files\Microsoft SQL Server\MSSQL\Data\templ... Identical 524288 04/26/05 11:37:07
For Help, press F1
Different: 0

The first thing to setup here is how you want the comparison result to display. Click the button **Filter** on the menu bar to get next dialog box. Select the display option according to your needs and click **OK**. The default setting is on **Display all results**.

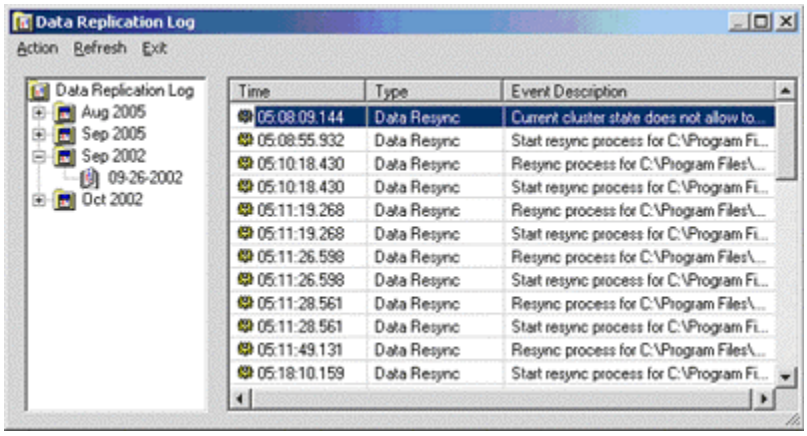


The next thing to do is to find the source file of the replication. Browse by click button ..... to select the folder of a **File Replication** definition.

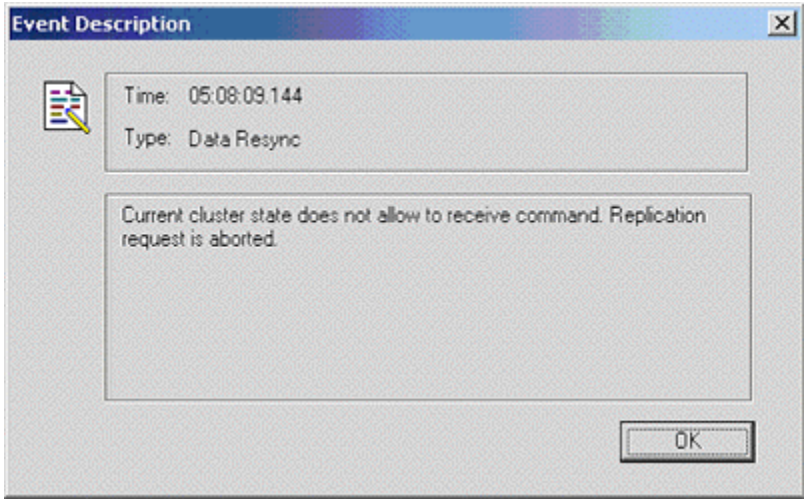
Click button to get the comparison results. By default, all files and folders are to be listed. If there are problems in some replicated files, you may find wordings such as **file does not exist** in the **Remark** column.

## 6.5 Data Replication Log

The data replication log is created for you to trace the replication actions on files or folders, and decide if some files or folders are not properly replicated that you need to run a manual-sync to ensure accuracy of the data on the Standby system.


Data Replication Log
Action Refresh Exit
Data Replication Log
Aug 2005
Sep 2005
Sep 2002
09-26-2002
Oct 2002
Time Type Event Description
05:08:09.144 Data Resync Current cluster state does not allow to...
05:08:55.932 Data Resync Start resync process for C:\Program Fi...
05:10:18.430 Data Resync Resync process for C:\Program Files\...
05:10:18.430 Data Resync Start resync process for C:\Program Fi...
05:11:19.268 Data Resync Resync process for C:\Program Files\...
05:11:19.268 Data Resync Start resync process for C:\Program Fi...
05:11:26.598 Data Resync Resync process for C:\Program Files\...
05:11:26.598 Data Resync Start resync process for C:\Program Fi...
05:11:28.561 Data Resync Resync process for C:\Program Files\...
05:11:28.561 Data Resync Start resync process for C:\Program Fi...
05:11:49.131 Data Resync Resync process for C:\Program Files\...
05:18:10.159 Data Resync Start resync process for C:\Program Fi...

If a Event Description is too long, double click it will bring up a message box with the full description listed in it as shown in the picture below.


Event Description
Time: 05:08:09.144
Type: Data Resync
Current cluster state does not allow to receive command. Replication request is aborted.
OK

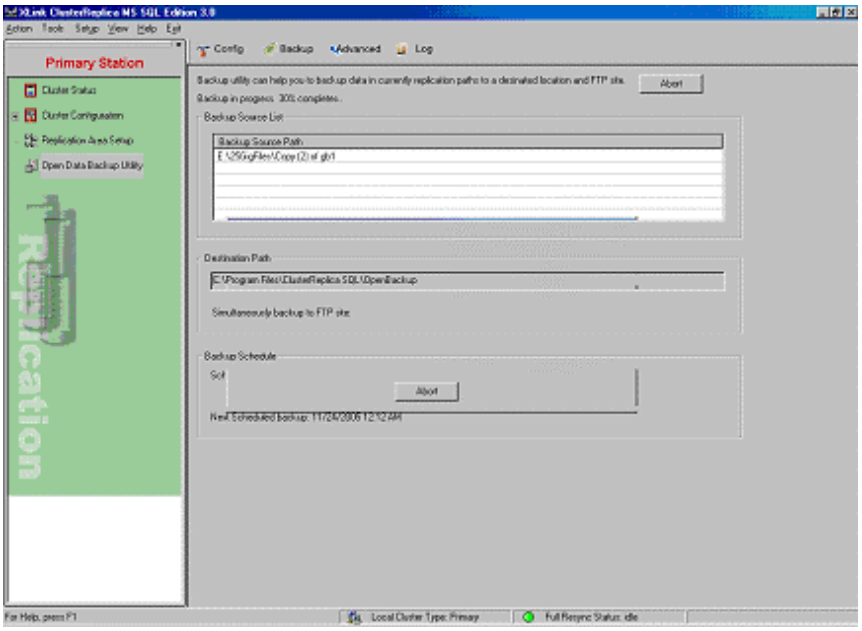
## Scheduled File Backup

This tool completes the data protection routine by assisting users to backup the data on the Secondary station to a remote location. Why the Secondary station - because the backup process will not affect the server performance on the Primary station which services the network clients during normal operation.

When select **Open Data Backup Utility** on the main menu, the Backup configuration panel comes up on the right. As regular backup configuration, you need to provide:

- Backup source
- Backup destination
- Backup schedule

This backup tool also provides the FTP data transport method to promote remote backup to higher efficiency.

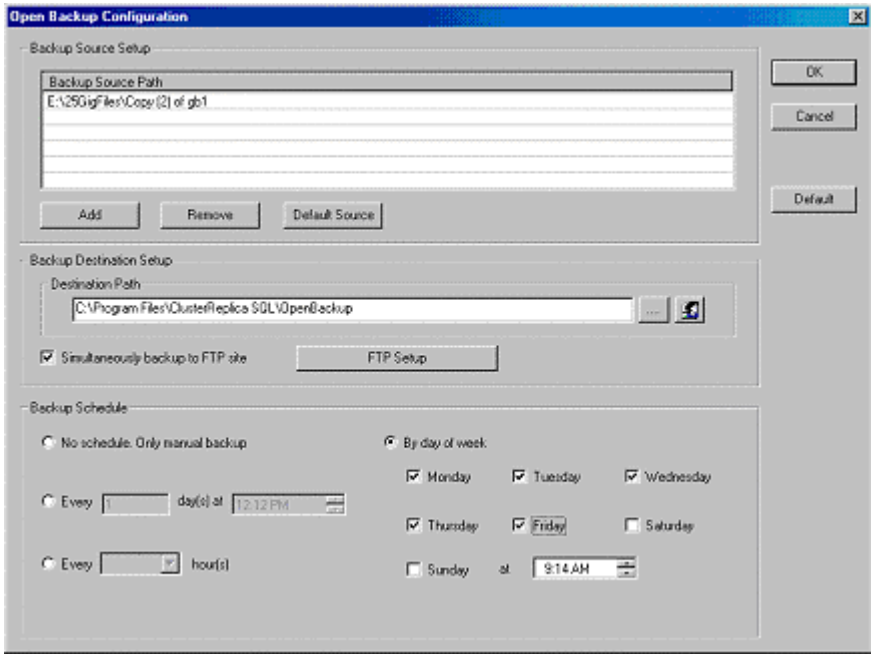



The four buttons on the top of the configuration panel are:

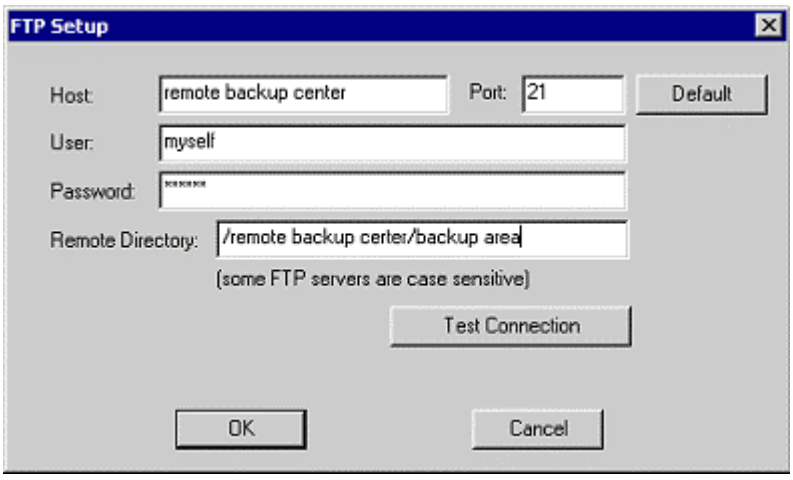
1. **Config** - click this button to setup the backup source, destination, FTP choice and schedule
2. **Backup** - click this button to perform a one-time, instant backup, this action should not affect the pre-set schedule
3. **Advanced** - click this button to change the default temporary backup location if larger space is expected to be needed
4. **Log** - click this button to view the backup actions logged

## 7.1 Two examples on backup configuration

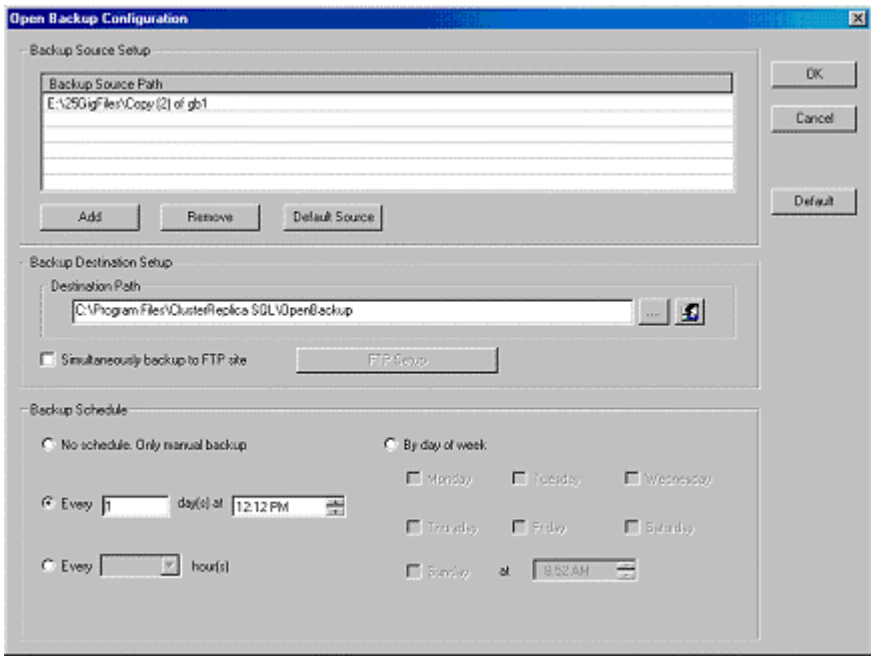
- Backup is scheduled at 9:14am on every weekday and FTP is enabled to backup the files in the source location to a remote location



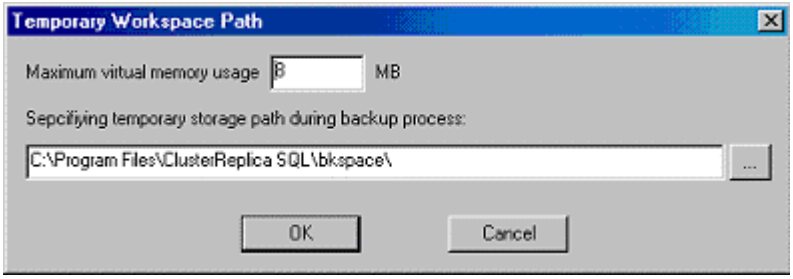

The FTP remote directory is the home directory on the remote system that the local system would normally connect to when using FTP protocol



- Backup is scheduled on every day at 12:12pm without the FTP remote backup.




The default temporary workspace location can be changed by click the **Advanced** button.



# Other Utility Tools

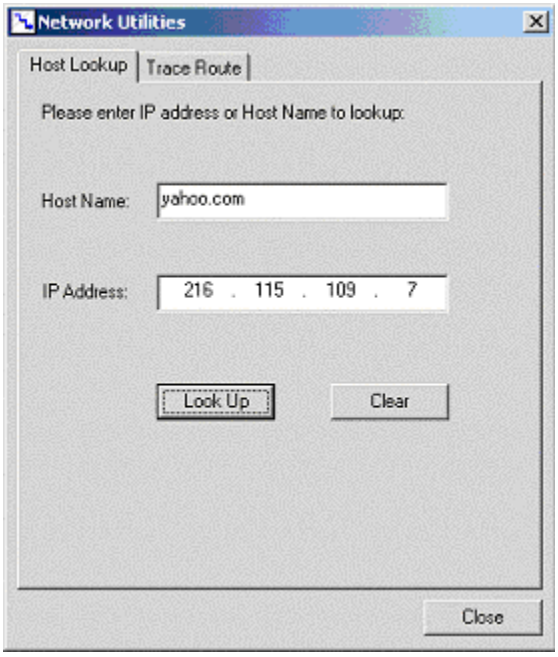
Along with the ClusterReplica SQL 3.0 comes with some utility tools that may help users better work in their network environment.

## 8.1 Network Utilities

There are times when a user needs to know the IP address of a registered host, or the network transaction routing path. ClusterReplica's Network Utilities tool can help you achieving this objective. This network utility tool consists of two features: Host Lookup and Trace Rout.

► **Host Lookup**

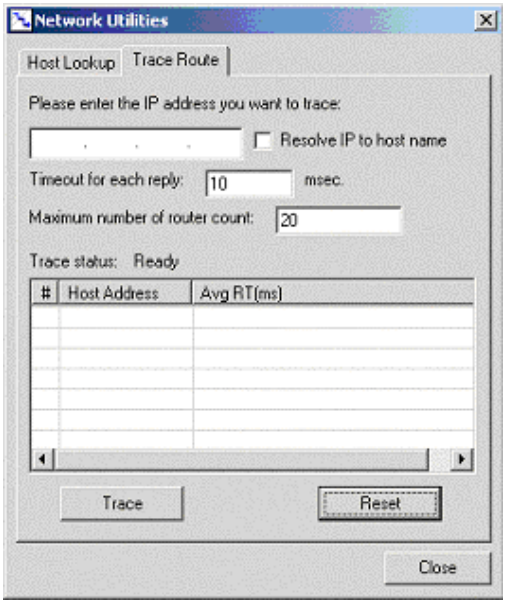
Host Lookup can help users match the IP address of a web host with its name. As shown in figure 6.1 below, to find the IP address of yahoo, type **yahoo.com** in the *host name* window and click on button **Look Up**. The IP address for yahoo.com will be found and filled in the *IP Address* window.




A **reverse lookup** can also be done using **Host Lookup**. In this case, user simply types in the IP address to find the registered host's name.

**Trace Route**

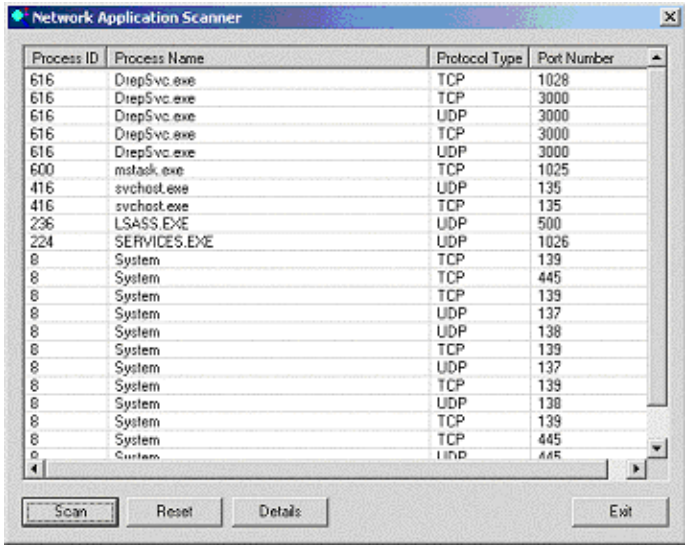
► The second feature in Network Utilities is **Trace Route**. This tool is created to help users trace the routing path of service providers between the host and the traced servers. Up to 20 router activities will be listed.



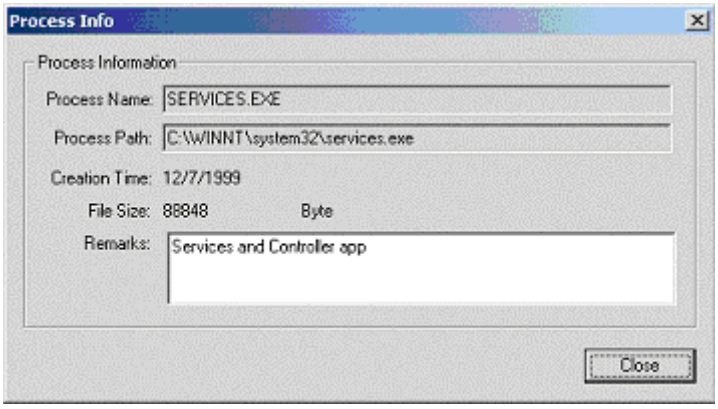

It is fairly simple to use this tool. Select **Trace Route** tap from the Network Utilities GUI, type in the Host's IP address and then click on button **Trace**. The packet routing path of all internet service providers (up to 20) will be listed in the **Trace status** screen.

## 8.2 Network Application Scanner

The Network Application Scanner can scan the operating system and find out all network applications running on it. From its dialog box, click on button **scan** to get the services of all applications currently running on the system listed.

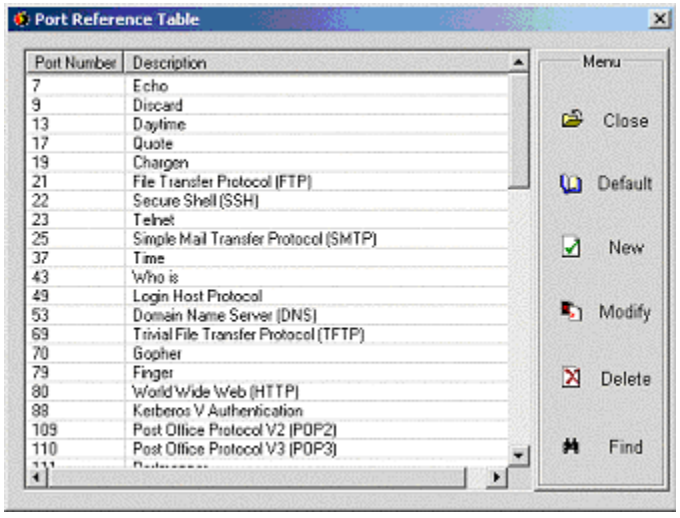


Click on button **Details** will get a popup box to come up showing you the detailed information of the network application.




## 8.3 Port Reference Table

The Port Reference Table lists some of the most commonly used ports with description as reference for users.




On the menu,

- **Default** will bring up the default listing.
- **Modify** allows changing of a port's description.
- New port definition can be created in **New**.

Click on the column title **Port Number** will sort the port numbers in ascending order; and **Description** will sort the port descriptions in ascending alphabetical order.